FOOD MANUFACTURE

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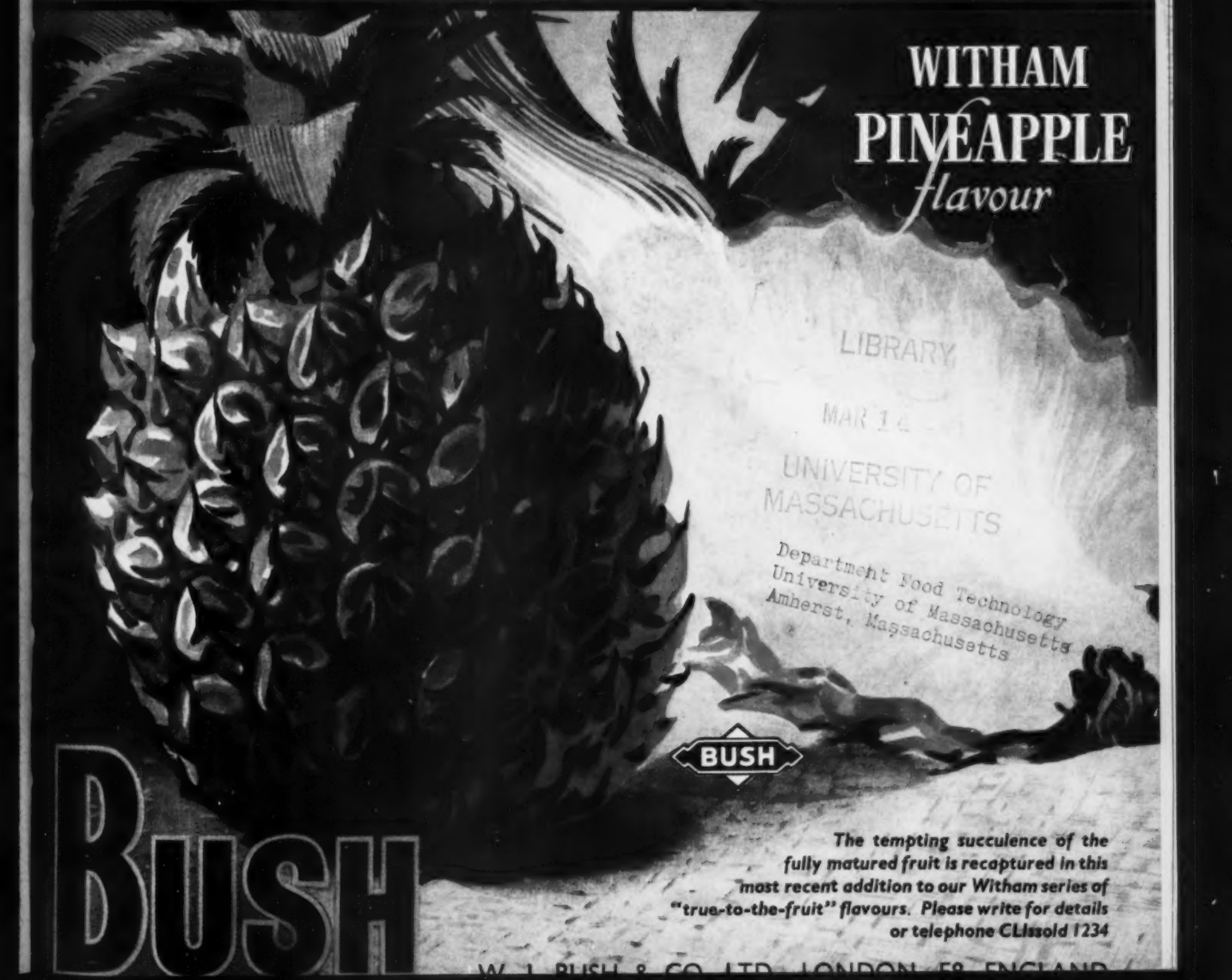
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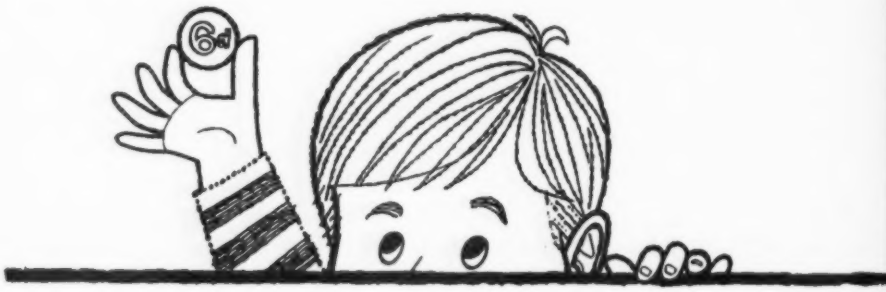

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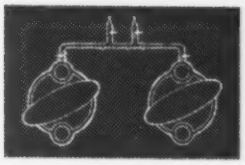

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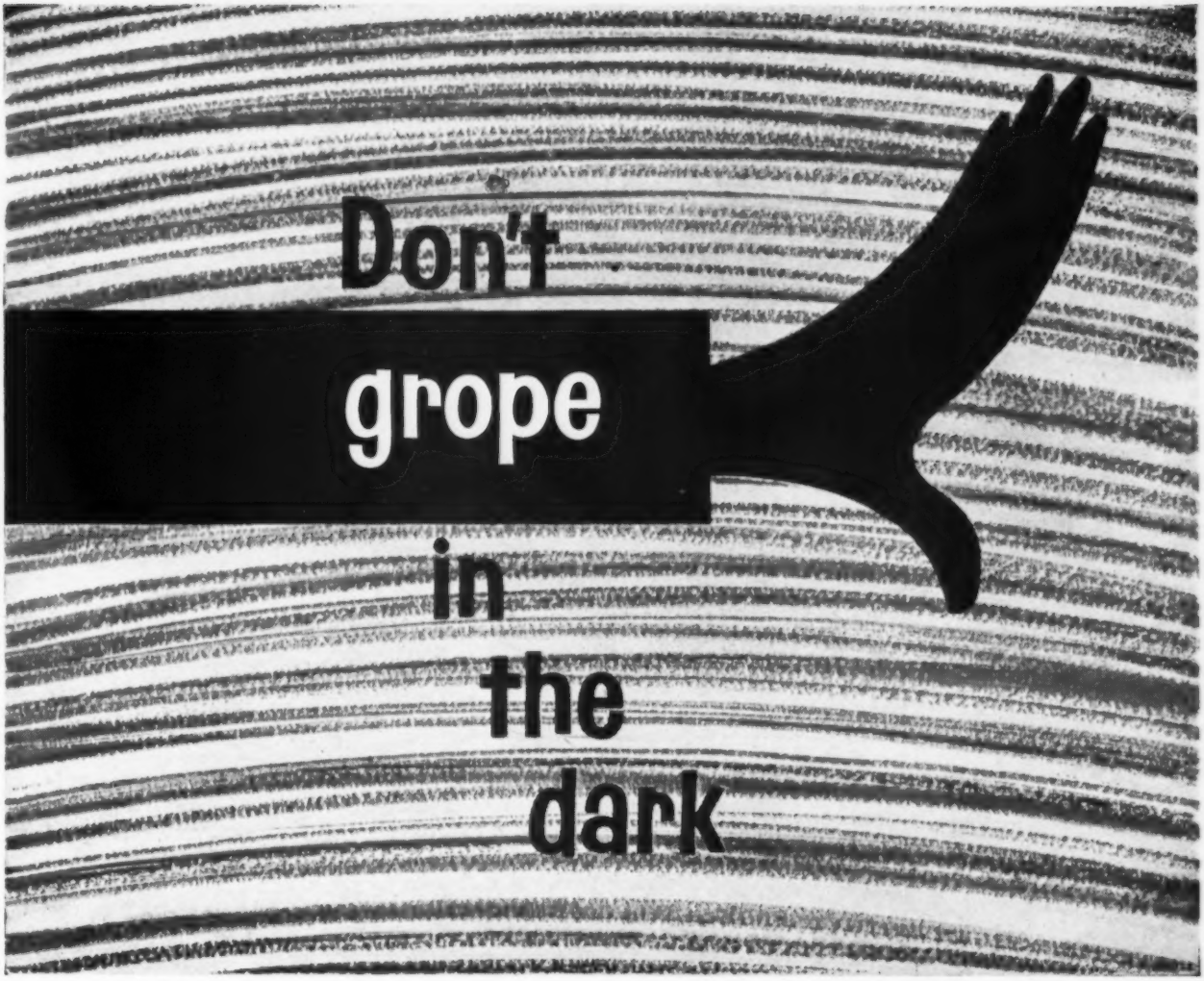

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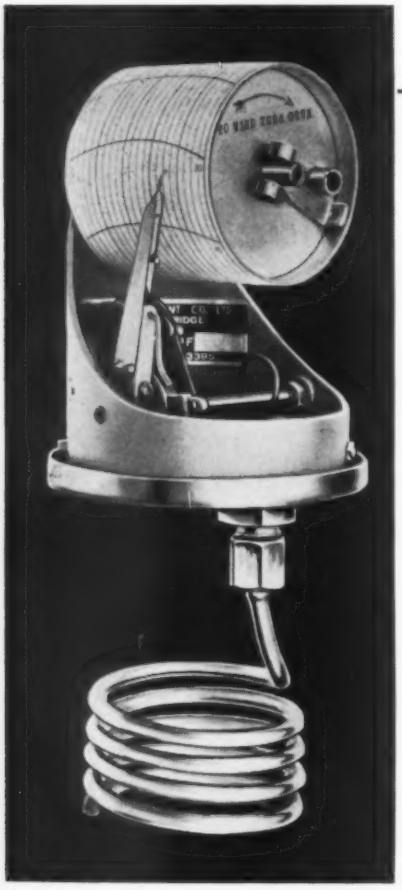

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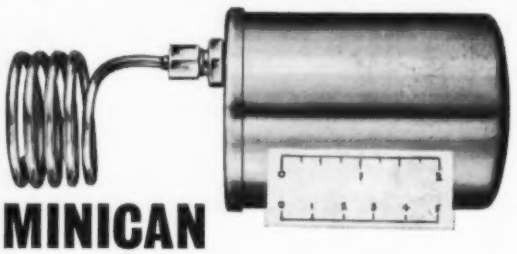

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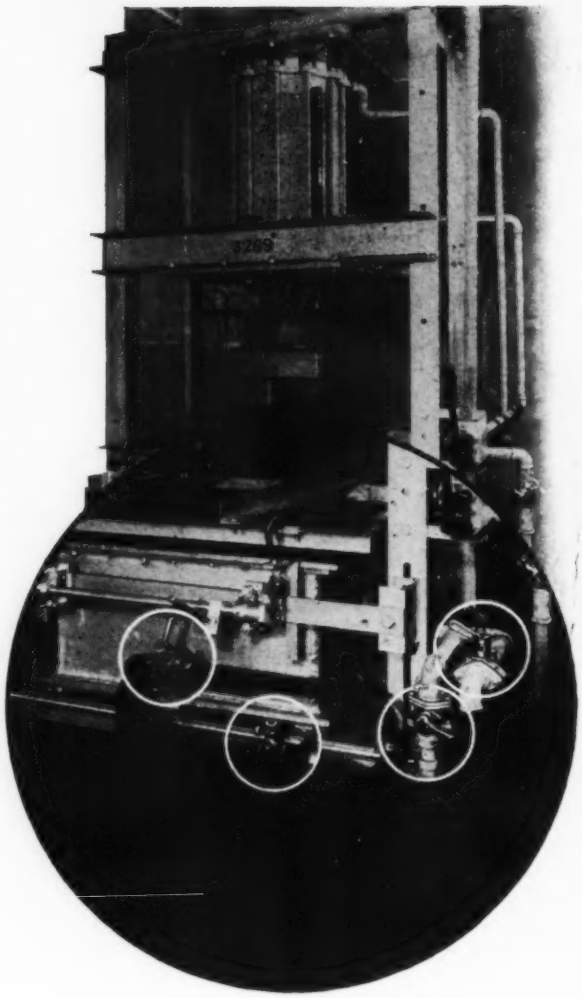

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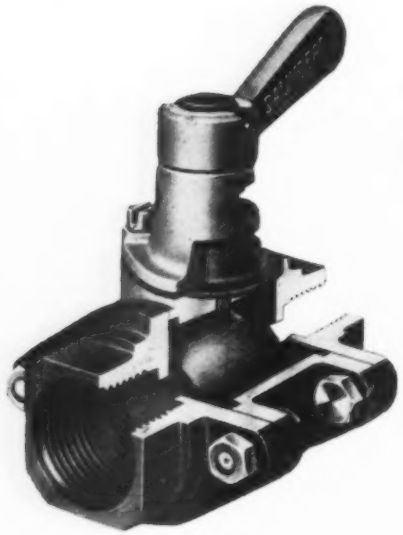

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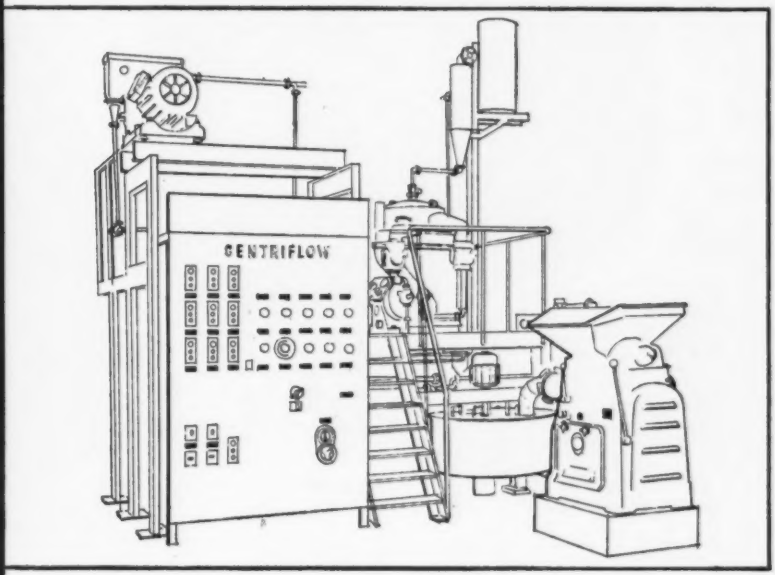

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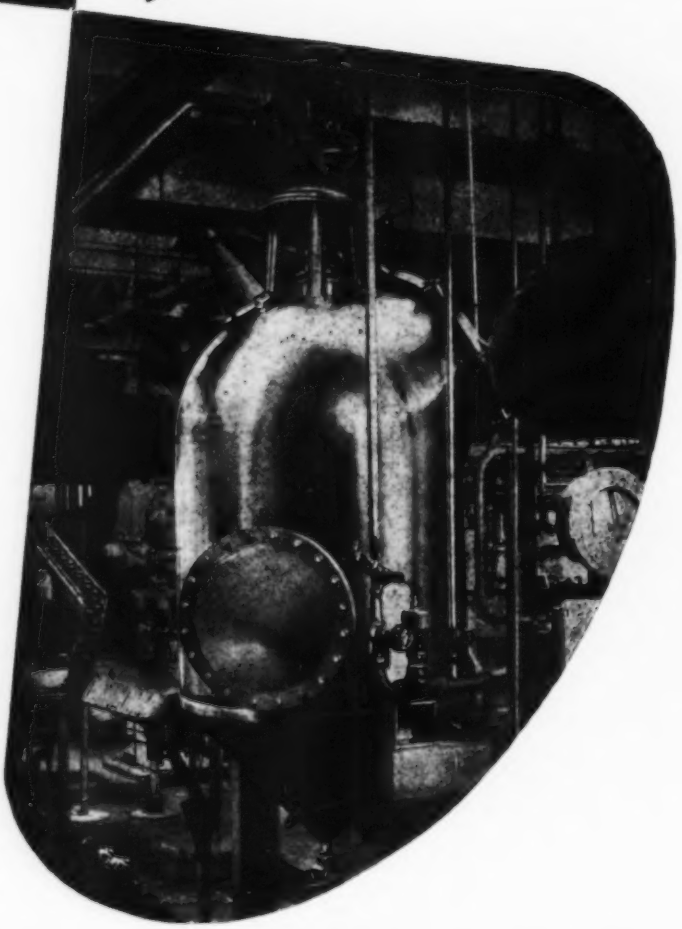

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Accurate Measurement—Fast Control

Special Honeywell design incorporates a micro switch for added sensitivity ... is fully compensated for ambient temperature changes ... ensures quick, precise indication of operating temperature.

Remote Bulb—Flexible Installation

The provision of up to 20 feet of flexible brass-armoured capillary tube enables the bulb to be positioned in the oven wall, and remote from the control unit. Range of bulbs covers operating temperatures from —50°F. to +1,200°F.

Honeywell Styling—Honeywell Service

Attractively designed, sturdily constructed, the control unit is suitable for flush or surface mounting. Pre-sales advice and post sales engineering service is freely available from Honeywell Branch offices in principal towns and cities in the United Kingdom and throughout the world.

Honeywell

First in Control

SINCE 1885

WRITE OR SEND THE COUPON TODAY
Honeywell Controls Limited Ruislip Road East
Greenford Middlesex WAXlow 2333

I am interested in your
Indicating Temperature Controller.
Please send me :
Specification Sheet S1010-7.

NAME .....

POSITION .....

ADDRESS .....

F.M.

the finest lifting tackle in the world is BUILT HERE!

KING of Stevenage

Materials Handling Specialists

REGISTERED TRADE MARK

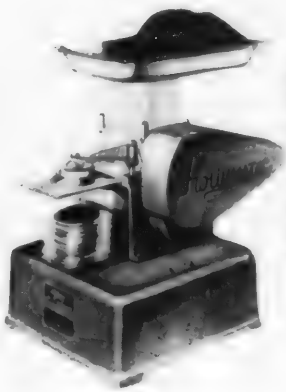
GEO. W. KING LTD · 58 ARGYLE WORKS · STEVENAGE · HERTS. *Telephone: Stevenage 440*

DO IT BETTER, FASTER and at LESS COST with

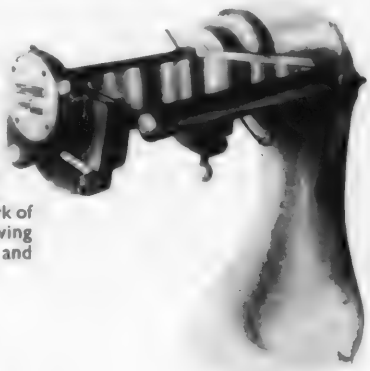
STOKES & DALTON'S

MEAT PROCESSING MACHINERY

Meet the challenge of competition by faster, better processing. Designed for ease of operation and simple maintenance, these modern machines can play an important role in the development of YOUR products. Ask for demonstration.

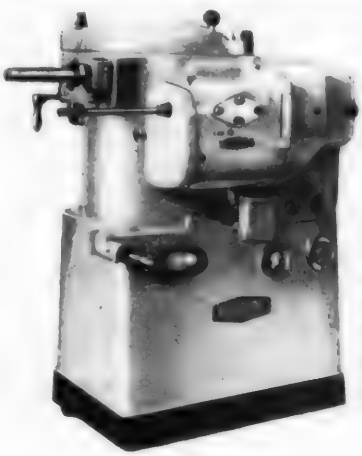


Hollymatic Patty Making Machine. This amazing new machine will produce up to 2,100 patties or hamburgers an hour, stacking them automatically on paper.

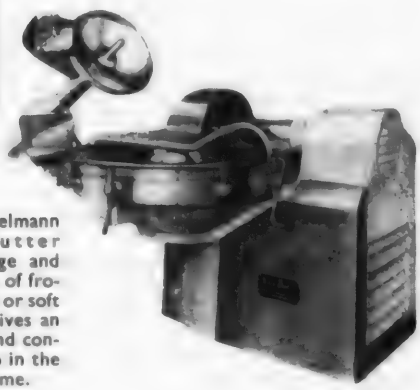


Townsend Derinder. Simple to operate and of uncomplicated design. Makes short swift work of any cut, removing rind smoothly and evenly.

THEY MEAN BUSINESS these STOKES & DALTON products



Vemag Filler and Linker. Operates with speed and astonishing accuracy for indefinite lengths of time. Output 2 to 16 identical links per lb. of any desired size.



The Seydelmann Super Cutter handles large and small pieces of frozen, chilled or soft meat and gives an excellent and consistent chop in the minimum time.

STOKES & DALTON LTD

Victoria Spice Mills, Leeds, 9

TELEPHONE: LEEDS 31701 (10 Lines) *TELEGRAMS: NUKRISKO LEEDS*

150

Norway Chooses the best

PHOTO BY COURTESY OF MESSRS. DAG-NY MARGARIN—FABRIKK A/S PILESTREDET 75c. OSLO, NORWAY

WITH THE

★ Votator *continuous* PROCESSING APPARATUS

Norway, one of the greatest margarine producing countries, chooses Votator Apparatus because . . . it requires only a fraction of the operating staff to give a similar output by ordinary methods . . . requires virtually no supervision . . . gives a superior texture and finish to the resultant product, with consistent uniformity . . . fulfils the highest standards of hygiene: the margarine arrives at the packing machines entirely untouched by hand via the Johnson Constant Pressure Buffer Units.
Votator Continuous Processing Apparatus is in use all over the world for the automatic and economical production of MARGARINE, LARD, MARSHMALLOW, SOUPS, SAUCES, GELATINE, TURKISH DELIGHT, STARCH JELLY, BISCUIT CREAM, and many other well-known foods and sweets.

PILOT PLANT SERVICE

Ask for the services of our Process Engineers and fully equipped Votator Laboratory for developing new applications or improving existing ones for continuous heating, cooling, crystallising, etc., of viscous or liquid materials by closed-processing plant.

★ *"Votator" is a trade mark which applies only to the products of The Girdler Process Equipment Division, Chemetron Corporation, or their licencees.*

THE FIRM WITH THE STAINLESS REPUTATION

Johnson's

A. JOHNSON & CO. (LONDON) LTD

Villiers House, Strand, London, W.C.2.

Telephone: Trafalgar 1541 Telegrams: Agenticum, Telex, London

What, food in Scotch bottles?

NOT EVERY SCOTCH BOTTLE has whisky in it. I discovered that at Alloa. They make bottles for hundreds of products—call them Scottish bottles if you like. They're all made out of Scottish glass, right here in the heart of Scotland. From now on I'll be getting them for all my products. Scotland forever!

The Alloa Glass Work Company provides a complete glass packaging service, on the spot for the Scot. They have first-class research and design facilities and an associated closure company, here in Scotland too. Every one of their customers gets individual attention. If you would like this kind of service, please get in touch.

ALLOA GLASS

The Alloa Glass Work Co. Ltd..
Glasshouse Loan, Alloa, Scotland. Phone: Alloa 761 *(5 lines)*.

Dudeney & Johnston Ltd. Bedford make really good use of clean, hygienic 'Darvic' in their stores

Blue 'Darvic' sheet is used to face exit cash desks and white to panel the pillars. Red and blue 'Darvic' are used for the 'Way Out' notice at Dudeney & Johnston Ltd., Bedford.

Dudeney & Johnston Ltd., make excellent use of 'Darvic' p.v.c. sheet throughout their store at Bedford. Not only is 'Darvic' an attractive, fresh-looking material — it is a clean, hygienic material too. 'Darvic' will not taint food or drink and is quick and easy to clean. Though light in weight, 'Darvic' is tough and durable. It resists corrosion, has low thermal conductivity.

'Darvic' is available in a wide range of modern colours. Dudeney & Johnston Ltd., use white, blue and red 'Darvic' to great effect in their store. The overall appearance is gay, spotless and essentially up-to-date.

Company initials are fret cut in black 'Darvic'.

Refrigeration and other storage cabinets are faced and shelves covered with blue 'Darvic' in the reception rooms' bar.

'Darvic' is the registered trade mark for the rigid p.v.c. sheet made by I.C.I.

PD 75

ICI

IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1

CRANFORD
½lb. size:
4¼" x 3⅛" x 4"
1lb. size:
4⅞" x 3¼" x 5¼"

INTRODUCING THE NEW 1960 RANGE OF

Decorated Stock Boxes

- ***Immediate delivery from stock***
- ***Reduction in price this year***

This year the increased sales and goodwill that result from decorated stock boxes will actually cost you less! The new Metal Box range includes containers suitable for almost all bakery and confectionery products, as well as tea, coffee etc. A wide choice of sizes, shapes and superbly colour printed designs is available.

Order early to avoid disappointment!

QUANTITIES FROM 10 DOZEN UPWARDS!

You can order as few as 10 dozen in a single design or size of Metal Box stock boxes or, of course, any larger quantity you like. Long production runs mean very reasonable prices too. Stock boxes are proven sales makers in normal distribution and can also be used for carrying out special trial schemes. Send today for full list and prices.

CAMELIAS
7⅛" x 3½" x 2⅜"

MB

METAL BOX

THE METAL BOX COMPANY LIMITED · 37 BAKER STREET · LONDON W.1 · HUNTER 5577

Processed Food Cans · Metal Containers · Paper Products · Plastic Packages and Laminations

MB21/40

BIRDS AND BEASTS—
BOTTLED BY UNITED GLASS

The Budgerijar

LIFE SPAN: indefinite (glass never ages). **COLOURING:** various (flint, pale, green, amber, blue, opal). **HABITAT:** United Glass – the place to go for the best glass packaging service:

- The finest in modern glass package design and research.
- Containers and closures made together to suit each other perfectly.
- The United Glass Packaging Advisory Bureau to give you expert help.
- The right type of container for every kind of product.

Glass makes the finest containers of all—and United Glass makes them by the million. Come and see how we can help you.

UNITED GLASS

UNITED GLASS LTD., LEICESTER HOUSE, 1-4 LEICESTER SQUARE, LONDON, W.C.2
TELEPHONE: GERRARD 8611 TELEGRAMS: GLASPAK, LESQUARE, LONDON

The man who makes the good things you sell

takes extra pride in his work when he's given top quality ingredients. Whether his recipe is formulated in quarts or cwts. supply him with WILTS pure milk products. And WILTS have an expert advisory service that is at your beck and call should you (or he) need it.

CURRENT PRICE LIST GLADLY SENT ON APPLICATION TO

WILTS UNITED DAIRIES LIMITED

TROWBRIDGE · WILTS

A MEMBER OF THE LARGEST DAIRY ORGANISATION IN THE COMMONWEALTH

WILTS
UNITED DAIRIES

finest way of saying Milk Produ

MILK POWDER IN ALL ITS FORMS, SWEETENED CONDENSED MILK, FULL CREAM OR SKIM, EVAPORATED MILK—AND, OF COURSE, BUTTER, CHEESE AND ALL OTHER DAIRY PRODUCTS

Quality • Economy • Service • Strength • Design

Travel in this space age is a commonplace. Busy executives do it, holidaymakers do it, "FIBERITE" Cases do it - million upon million of them every year - packed with the products of British industry and agriculture. Passengers are able to take care of themselves, but goods need the sure and sturdy protection of "FIBERITE" packing. The hazards of travel may vary with distance yet whether the journey is half way round the world or to the next town "FIBERITE" Cases have the inbuilt quality to see the goods to their destination safe and sound.

REGISTERED
FIBERITE
TRADE MARK
PACKING CASES

ORANGE
LEMON
BLACKCURRANT
add the true flavour
CHERRY
GINGER
use Rayner's
LIME
RASPBERRY
Known for over 100 years for Quality
Rayner and Co. Ltd.
London N.18
PINEAPPLE

DTV.A1

CLOSURE by KORK-N-SEAL

for Northam Warren Limited

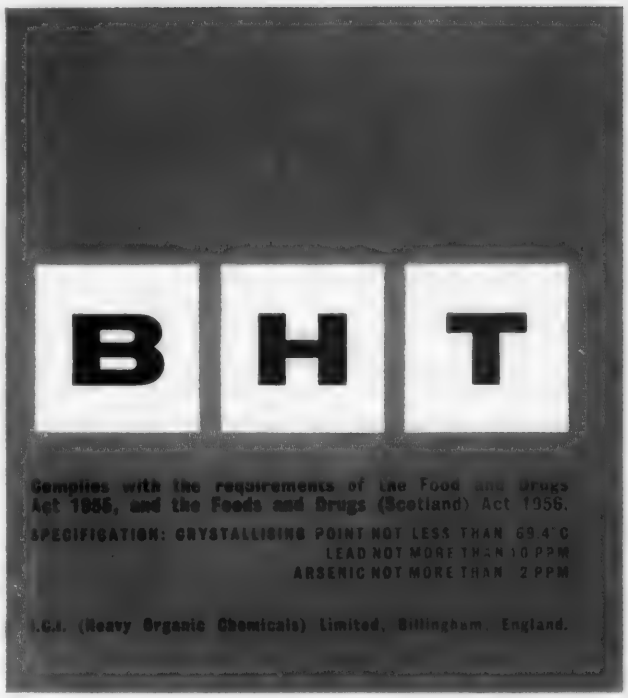
Kork-N-Seal make a wider variety of closures than any other British manufacturer, for glass, metal and plastic containers. As part of United Glass Ltd., Britain's leading makers of glass containers, they can produce and deliver your closures and glass containers together.

If you need closures, or expert advice on closures, come to Kork-N-Seal. You'll get the best service there is. Please write or 'phone.

KORK-N-SEAL

The Closure Division of United Glass Limited

KORK-N-SEAL LIMITED
Leicester House, 1-4 Leicester Square, London, W.C.2.
Phone: GERrard 8611. *Grams:* Korkanseal, Lesquare, London


B H T
Complies with the requirements of the Food and Drugs Act 1955, and the Foods and Drugs (Scotland) Act 1956.
SPECIFICATION: CRYSTALLISING POINT NOT LESS THAN 69.4°C
LEAD NOT MORE THAN 10 PPM
ARSENIC NOT MORE THAN 2 PPM
I.C.I. (Heavy Organic Chemicals) Limited, Billingham, England.

'TOPANOL' BHT – a new food antioxidant

The *Antioxidant in Food Regulations, 1958*, permit the use of butylated hydroxytoluene in a variety of foods: 'Topanol' BHT is prepared with great care specially for this purpose.

'Topanol' BHT conforms with the requirements of the *Food Hygiene Regulations, 1955*, and other relevant legislation under the *Food and Drugs Act, 1955*.

'Topanol' BHT meets the following specification:—

Crystallising point	—	*not less than* 69.4°C.
Lead	—	*not more than* 10 p.p.m.
Arsenic	—	*not more than* 2 p.p.m.

Animal and vegetable oils and fats, and baked and fried foods containing these, are protected from rancidity at concentrations as low as 0.01% by weight—cooking temperatures do not destroy activity.

Paper and paper board wrapping impregnated with 'Topanol' BHT at low concentrations keep foods fresher by retarding rancidity at packaged food surfaces and on migrated films of fat.

The appetising appearance of food packs can be maintained by the use of plastic film wrappings (e.g. polythene) colour-stabilised and protected against embrittlement.

Natural and synthetic oil-soluble vitamins (e.g. in fish liver oils) and citrus and other essential oils are also the better for 'Topanol' BHT.

A PRODUCT OF

I.C.I. HEAVY ORGANIC CHEMICALS DIVISION

Full information on request

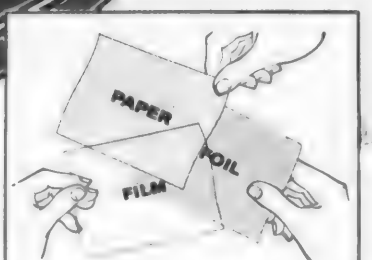
IMPERIAL CHEMICAL INDUSTRIES LIMITED

LONDON, S.W.1

Metal Box tested laminations protect and sell these products

New packaging materials are increasing the scope of laminations: at the Metal Box research laboratories investigations are made to ascertain their suitability—the compatibility with the product, safe shelf life under a wide range of conditions, capabilities on high-speed forming and filling equipment—these points can be assured for your product by Metal Box before a final decision to use a lamination is made.

If you have in mind a free sampling campaign, market trials, nation-wide or even world-wide scheme for unit packs let Metal Box prepare a lamination which will *maintain the quality of your product.*



Light, compact and beautifully printed, laminations can combine the strength and rigidity of paper with the toughness and heat sealability of plastic film and foil. Many different material combinations are available in the form of reels or pockets which can be filled and sealed on high speed equipment.

Consult Metal Box Plastics Group—early

METAL BOX PLASTICS GROUP

PLASTIC FILMS · LAMINATIONS · BOTTLES · MOULDED CONTAINERS

THE PLASTICS GROUP OF THE METAL BOX COMPANY LIMITED, 37 BAKER STREET, LONDON W.1. HUNTER 5577

MB/52/08

it can be done

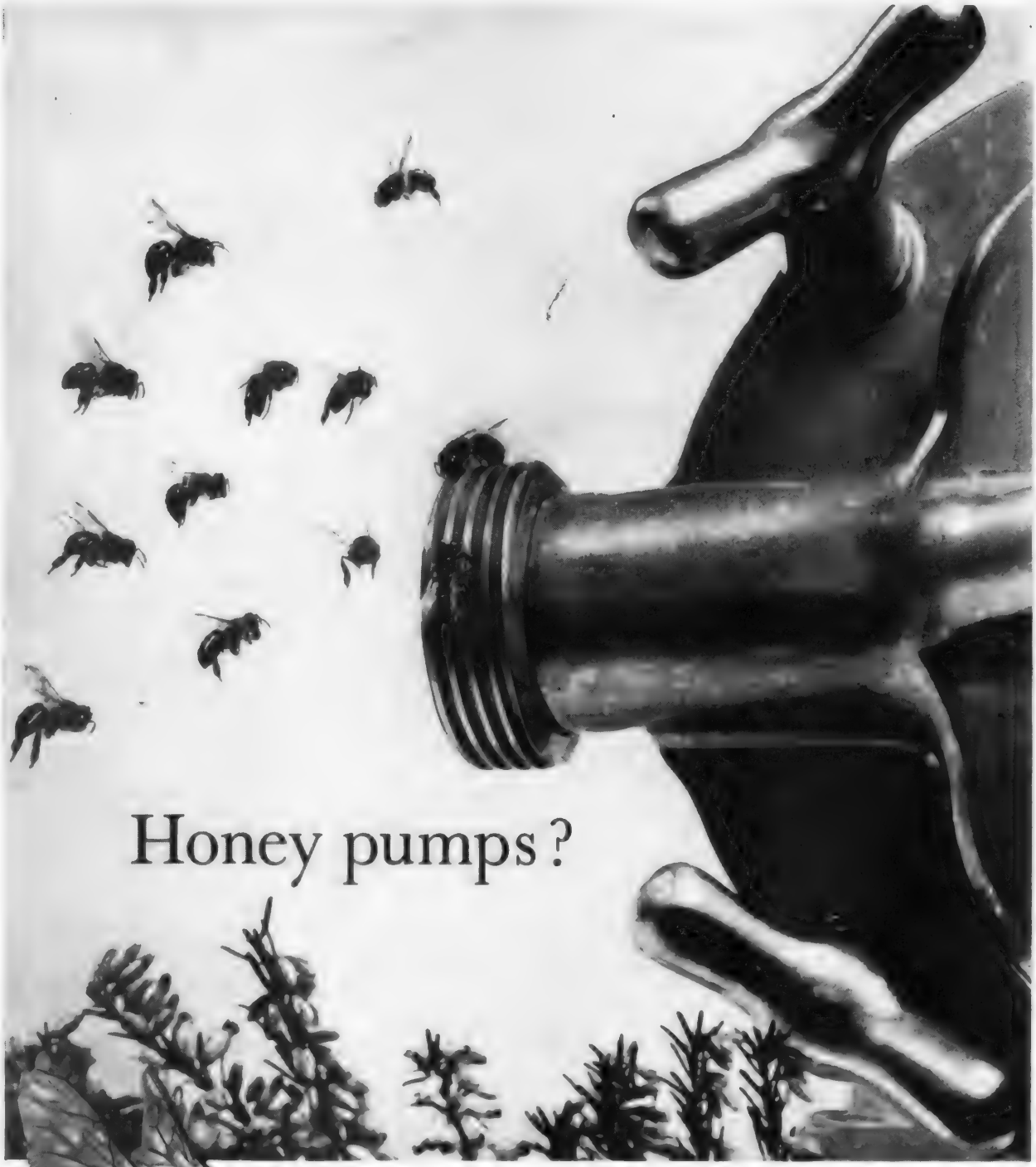
Sand castings in Hiduminium can and do combine density of structure with the kind of close-tolerance working which reduces subsequent operations to a minimum. H.D.A. make sand castings to this standard in low, medium and high strength alloys. Complexity of design is welcome.

Base for an industrial suction cleaning machine, produced as a superfine finish sand casting in Hiduminium 20 for R. G. Dixon Ltd.

Hiduminium *Aluminium*

makes the most of

HIGH DUTY ALLOYS LTD., SLOUGH BUCKS.



Honey pumps?

That's right. We make them. Very sticky problem. But then we're prepared for pumping problems, which isn't surprising after having solved so many for so many people. And not only in the food industry. You'll find our pumps in use also in the processing of chemicals, oils, cosmetics, dairy products—in fact, we pride ourselves on producing pumps for every purpose. Try us. Howard is the name.

all sorts of people pump HOWARD to solve their pumping problems

HOWARD PNEUMATIC ENGINEERING CO., LTD., FORT ROAD, EASTBOURNE · TEL: EASTBOURNE 4804-5 · TELEGRAMS & CABLES: HOWMATIC, EASTBOURNE

a packaging service

like this

makes the most of your products

Simply because your products — good as they are — need a 'visual plus' to sell faster than the competition. At Jackson's a *complete* packaging service produces Glass Containers with this in mind.
First class containers, backed up by a first class service evolving new ideas for you and your products.
If your products need a 'visual plus' they can get it from Jackson Glass.

Jackson packaging advisory service

A comprehensive service embracing design and advice not only on glass containers but also on closures, labelling, display boxes and outers. Ring Museum 7263 with any problem you may have.

Jackson research unit

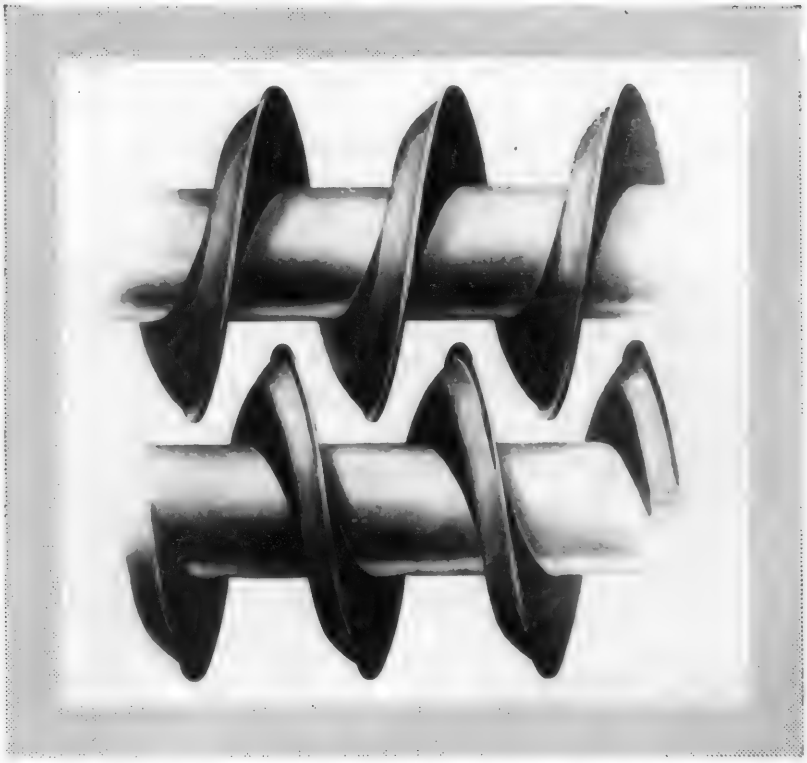
A team of experts, perfecting new types of glass packs and closures. If you have a new product or want to give a new look to an existing one, we may already have the answer for you.

So many good things come in

JACKSON GLASS

and are better for it!

JACKSON BROTHERS (OF KNOTTINGLEY) LIMITED
London Office 12 Gt. Portland Street W.1. Museum 7263
In association with J. W. Sutcliffe & Co. (1950) Ltd.



The

"HOLO-FLITE"

Processor

a continuous heat exchanger

* **Highly efficient heat transfer.**
* **Uniform heating improves product quality.**
* **Minimum particle degradation.**
* **Space saving design.**

The 'Holo-Flite' Processor is a screw conveyor with hollow flights through which a heat transfer agent is circulated. The material to be processed can be either heated, cooled or dried at a continuous uniform rate. The basic design of the 'Holo-Flite' Processor can be readily adapted for specific applications; for example a dome cover can be fitted to collect evaporated moisture in a drying process.

One of two 'Holo-Flite' Processors, Model 1D78-4", supplied to Imperial Chemical Industries Limited.

HOLDAN **Engineers (London) Ltd.**

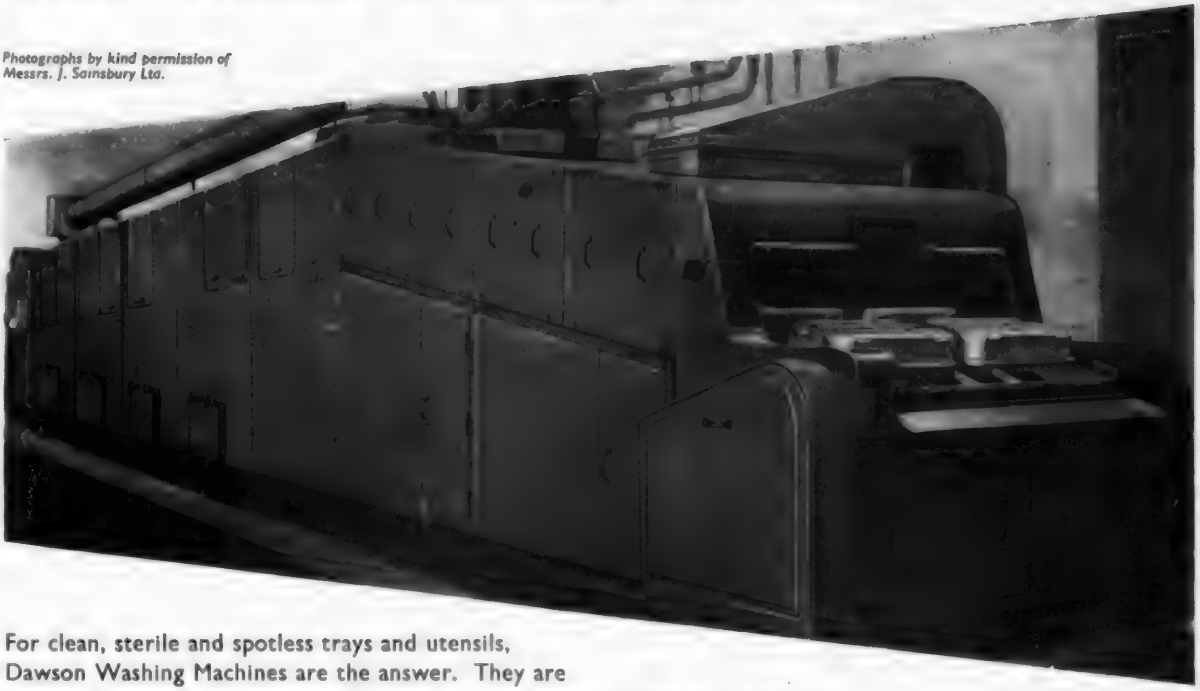
(In association with W. C. Holmes & Co. Ltd.)

119 Victoria Street, London, S.W.1. (Telephone: Victoria 9971-3)

A461

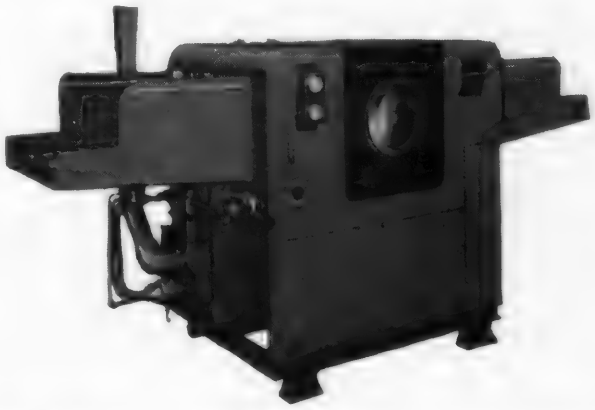
Trays and utensils are cleanest and freshest when washed with DAWSON PLANT

Photographs by kind permission of Messrs. J. Sainsbury Ltd.



For clean, sterile and spotless trays and utensils, Dawson Washing Machines are the answer. They are available to handle from under 100 trays per hour to over 2,000 and all machines can be supplied with or without a drying section.
The illustration above shows a large, high-output machine, used for washing a wide variety of aluminium containers for perishable foods.
The small washer on the right handles trays at the rate of up to 450 feet per hour.

Whatever your cleaning problem, write to our Leeds or London works and we shall advise you how to resolve it in the most efficient and economical way.



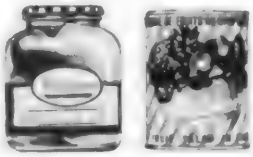
Dawson

DAWSON BROS. LTD., GOMERSAL, NR. LEEDS.
Tel.: Cleckheaton 3422 (5 lines)

London Works: Roding Lane South, Woodford Green, Essex
Tel.: Wanstead 7777 (4 lines)

Identical goods in alternative containers

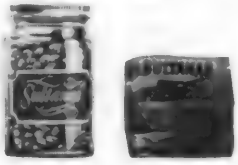
FRUIT SALAD
GLASS OUTSOLD OTHER PACK
10 to 3



PEARS
GLASS OUTSOLD OTHER PACK
5 to 2

SYRUP
GLASS OUTSOLD OTHER PACK
9 to 5

SULTANAS
GLASS OUTSOLD OTHER PACK
3 to 2



In a test just completed a range of identical pairs of foodstuffs, packed in glass and an alternative container, were placed side-by-side on the shelves of 33 self-service stores in London, Manchester, Glasgow and Newcastle.

All goods packed in glass were deliberately marked up by amounts varying from 1½d. to 4d. each. Despite this price loading, independently audited sales figures showed glass to be a clear winner. On twelve foodstuffs tested, 87% more goods were sold in glass than in the alternative containers and glass packs attracted over 120% more expenditure.

Full details of this impressive test are to be published soon. Your glass container manufacturer will be happy to let you have a copy on request.

See how good things are in

GLASS

GLASS

This is an advertisement of
THE GLASS MANUFACTURERS' FEDERATION • 19 Portland Place • London W1 • Langham 6852

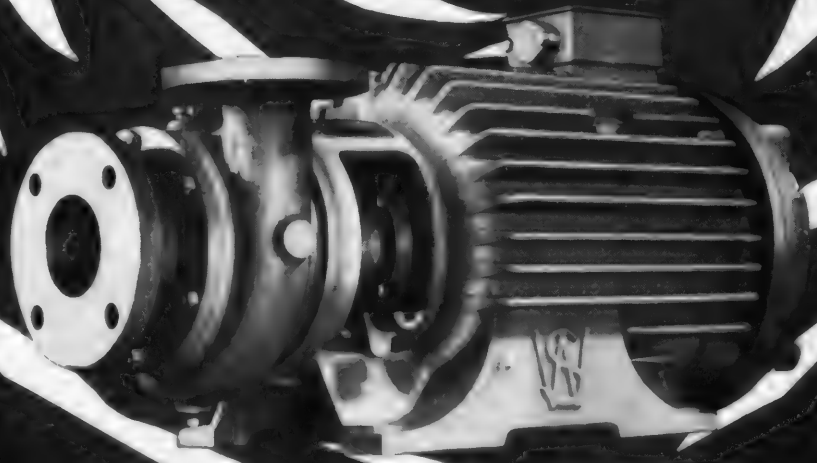
Avoid contamination with safe, clean pumping by Worthington-Simpson pumps

Worthington-Simpson pumps for circulating liquor are available in 18 8 3 stainless steel, and in "Worthite" super stainless corrosion-resisting alloy steel. Monobloc unit construction eliminates the complication of separate drives, guarantees perfect shaft alignment and affords easy installation and maintenance. Available in capacities up to 675 g.p.m., and heads up to 130 ft. depending on the capacity.

Worthington - Simpson

LTD NEWARK NOTTS

WS



GREATER SENSITIVITY...

From the NEW Mark 200 Tinsley Polarograph

SOME ADVANTAGES

Micro analysis—higher sensitivity.
New and better recorder with linear chart.
Increased chart width—to 200 millimeters.
Better discrimination.
Recorder will follow wave peaks.
Qualitative and Quantitative estimations.
Simultaneous estimation of several constituents on one polarogram.
Adaptable for analysis of metals, organic and inorganic substances.
Repeated analysis on the same sample.
Simplified operation for use by semi-skilled staff.
Routine analysis with speed and accuracy.

Write for further information to:

EVERSHED *INSTRUMENTS DIVISION* **EVERSHED & VIGNOLES LTD · Acton Lane Works · London W.4**
Telephone: Chiswick 3670 · Telegrams & Cables: Megger, London · Telex 22583
7.131

PERTINENT VIEWPOINTS ON R.O. SEALS

AUTOMATIC APPLICATION SPEEDS UP BOTTLE PACKING AND ENHANCES THE APPEARANCE OF THE PRODUCT . . .

say Works Managers

The great advantage of R.O. Seals in the packing of glass containers is their speedy, automatic application. Every cap is individually moulded to the threads of each bottle or jar. Sealing is hermetically perfect, guaranteeing the purity and freshness of the contents until sold. The R.O. Seal offers MORE! A neat, practical closure that does full justice to your product, carries your trade name in colour and assists in its identification at point of sale. Available in plain or pilfer-proof styles.

R.O. SEALS

Write now for samples and descriptive literature.

METAL CLOSURES LIMITED · BROMFORD LANE · WEST BROMWICH · STAFFS.

Telephone: West Bromwich 1786 · Telex: 33322 · Telegrams: "Closures" West Bromwich

GET COSTS DOWN
GET DODGE

Dodge economy goes further than just more miles per gallon. Extra heavy duty components minimise the possibility of road failures, reduce maintenance costs and ensure a long life capacity for hard work. Its ton-mile performance enables a Dodge to achieve a double bonus—a saving in both time and money.

THE TRUCK THAT CAN TAKE IT

MADE IN BRITAIN AND BUILT TO LAST BY DODGE BROTHERS (BRITAIN) LTD., KEW, SURREY. TELEPHONE: PROSPECT 3456 (12 LINES)

American tribute to the APV Plate Evaporator

Land O'Lakes Creamery Manager reports remarkable performance...

"45% SOLIDS IN 6 MINUTES"

The first APV Plate Evaporator installed in the U.S.A. was at the Land O'Lakes Creamery, Whitehall, Wisconsin. It has been greeted as an outstanding development in evaporation in a report by Roy Carlson, the Creamery Manager, published in an American Dairy Journal. He says:—

" Would you believe it if I told you that we haven't touched a control button on this new APV Milk Plate Evaporator since the day it was started up a couple of months ago ? It's true ! And we've been running night and day, seven days a week.

This new evaporator is float-controlled. There are no air controls for us to watch or work. We pre-set the equipment when we hooked it up. And now it runs itself !

From skim milk to 45% solids takes about six minutes with this evaporator. With other evaporators, this same process takes 25 to 30 minutes.

For efficiency and real operating economy, you just take off or put on more plates. Presently, we are only using 26 plates for each effect. The capacity is 43. So you can see the amazing flexibility available.

Simon Nogosek, my foreman, says he cleans this APV Evaporator in about 45 minutes. Its all equipped for cleaning right in place (C.I.P.). That's a break for his crew, because the other evaporators eat up about two and half hours of time in cleaning.

The old evaporators stand about a storey and a half high. This new APV Evaporator, even at maximum capacity, installs in an area 18' x 25' x 9'. We figure we could get about three of the APVs into the same space one of the old evaporators takes up.

This new evaporator easily handles all the work of the old one, and still can do much more. It's only operating at about 70% of its capacity. That's all we can handle in our drying rooms."

APV

THE A.P.V. COMPANY LTD · MANOR ROYAL · CRAWLEY · SUSSEX

TELEPHONE: CRAWLEY 1360 · TELEX: 8737 · TELEGRAMS: ANACLASTIC, CRAWLEY

DEMBY, HAMILTON & CO. LTD.

5, Fenchurch Street, London E.C.3

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GREEN AND WHITE
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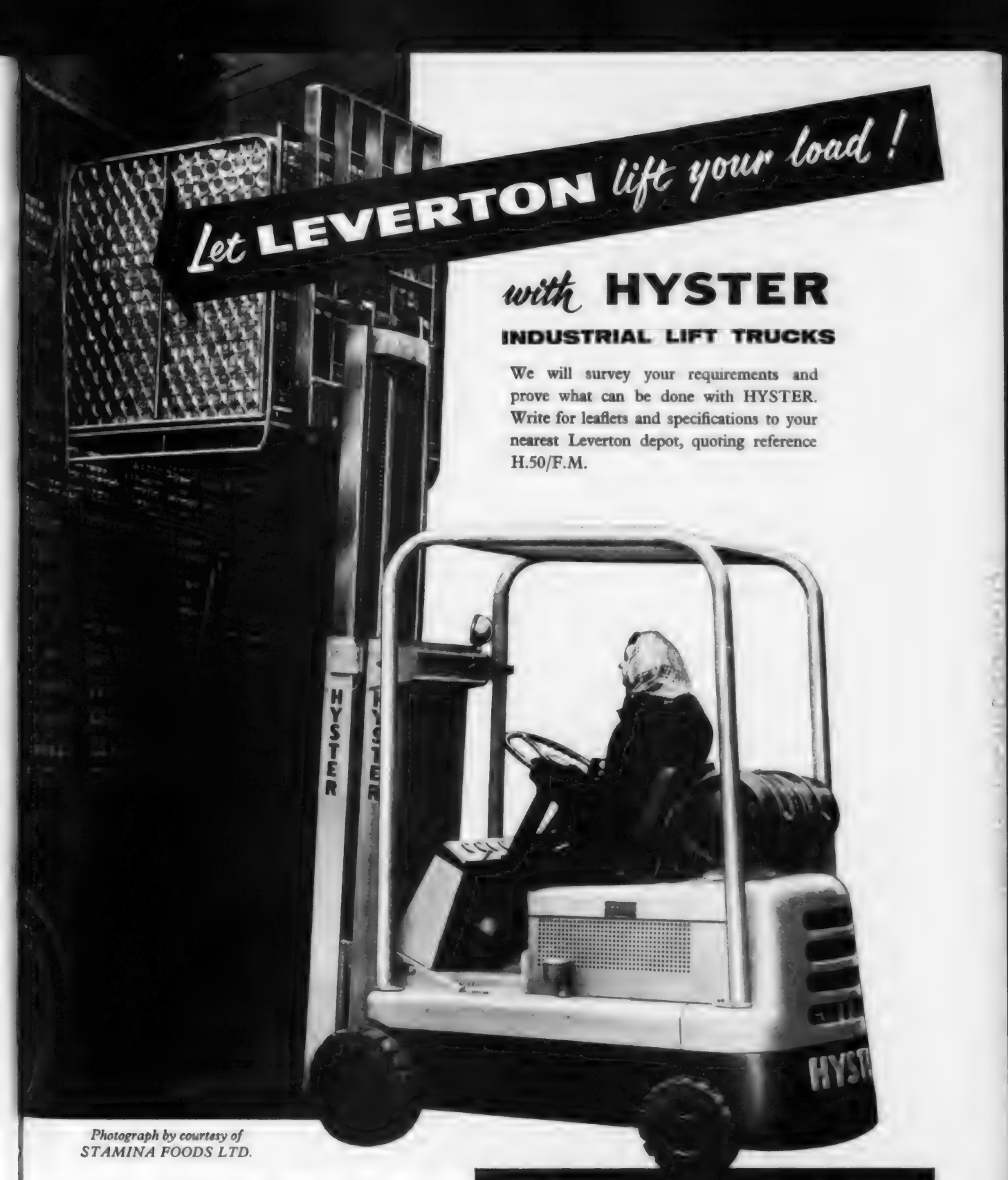

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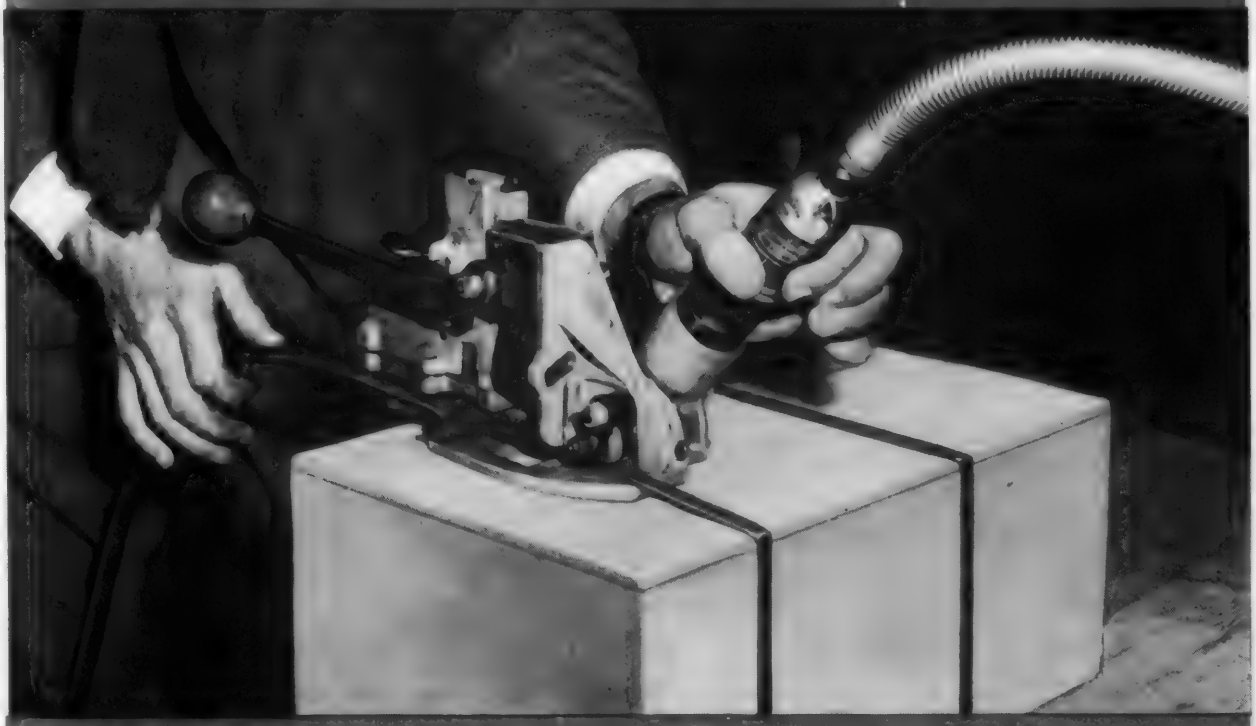

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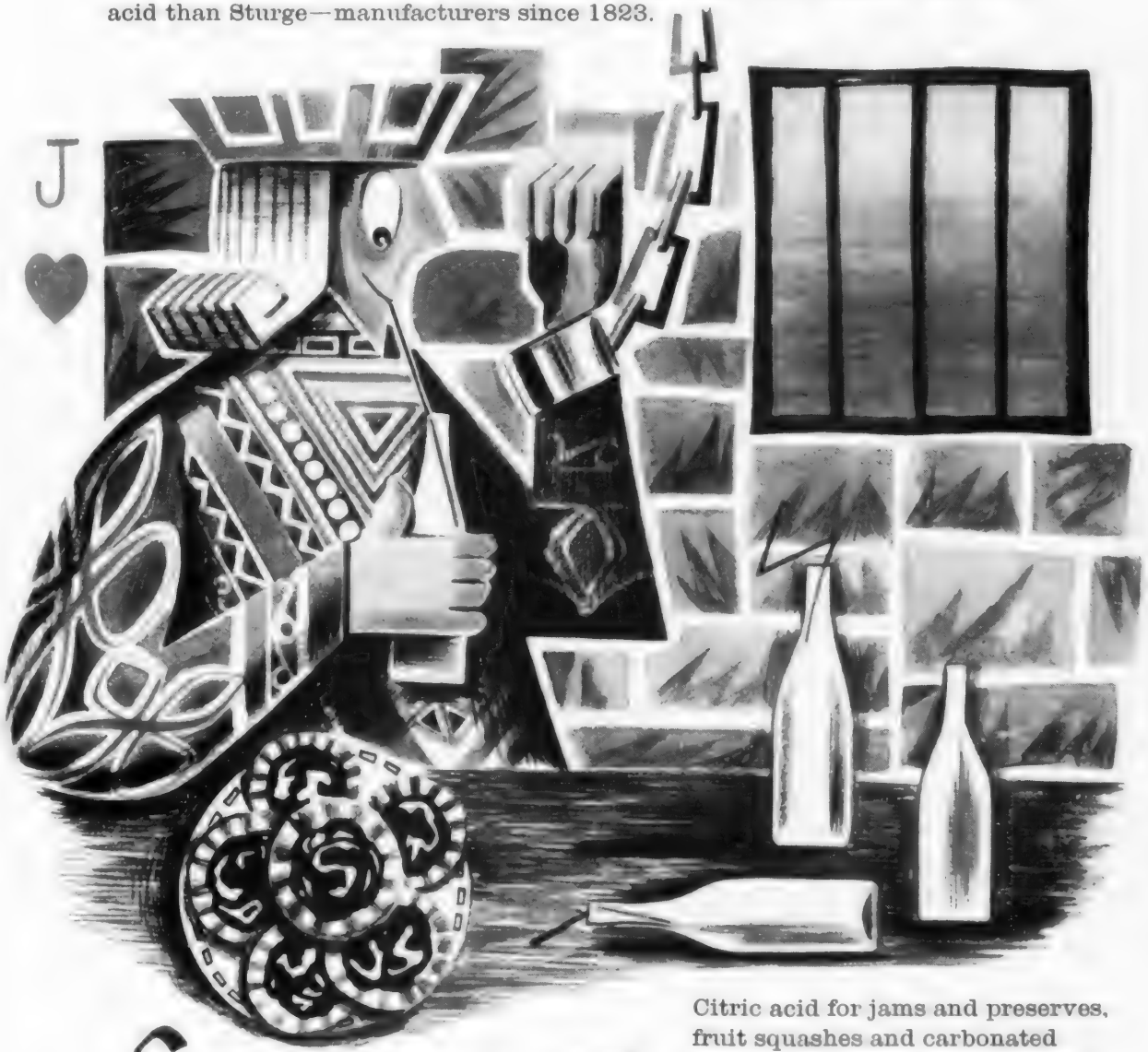

Citric acid for jams and preserves, fruit squashes and carbonated drinks, ice-cream, confectionery and other food products.

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Once right, the flavour of your brand must never deviate. StaffordAllenS see to this. StaffordAllenS flavours, rigidly controlled from batch to batch, safeguard your sales year in and year out.

✻ COMPATIBILITY

StaffordAllenS flavours are laboratory controlled to blend perfectly with your product. Our wide experience in developing flavours which really do sell is at your service.

✻ SECURITY OF FORMULATION

For many years we have worked with leading firms in the food and confectionery industries. You can rest assured that any discussion with us will be strictly confidential.

✻ ECONOMY

Flavouring is a comparatively small factor in your production cost, but a mediocre flavour can easily spoil a good product. On the other hand, a cleverly formulated flavour can put sales in the top bracket. StaffordAllenS offer the best—always at a keen price.

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Let our experts meet yours and evolve a real selling flavour! We do this for chocolate, flour and sugar confectionery, jellies, ice-cream, soft drinks, canned foods, sausages, pies and other specialised sections of the industry. We provide a well-equipped experimental kitchen in which samples of your products can be flavoured for comparison and testing. Whatever your food product, it will pay you to consult StaffordAllenS. Write for the attention of Mr. H. B. Heath, or telephone CLErkenwell 1000.

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CREATORS OF THE FLAVOURS THAT SELL

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TAS/AL.657

"...a dragon gules on two coils of sheet steel proper..."

THE Norman-English description of the emblem of The Steel Company of Wales Limited is couched in the language of an age when "product identification" was, quite literally, a matter of life or death. Coats of arms were invented to distinguish friend from foe in battle.

In modern business, product identification is also a matter of life or death. Customers may intend to buy your product; but if they can't recognize it, the chances are they'll buy your competitors'. You naturally rely on your pack to guide their preference your way. Have you ever thought of the great advantages tinplate can give you in product identification?

NEW COLOURFUL PACKS

Tinplate can take 4-colour printing in reproduction equivalent to that on the finest art-paper. If you print your product's emblem on tinplate it will stand out because of its accuracy and its vividness.

You can design beautiful new, colourful packs; and their brilliance will be faithfully portrayed on tinplate. For unmistakable, hard-hitting product identification, tinplate is unsurpassed.

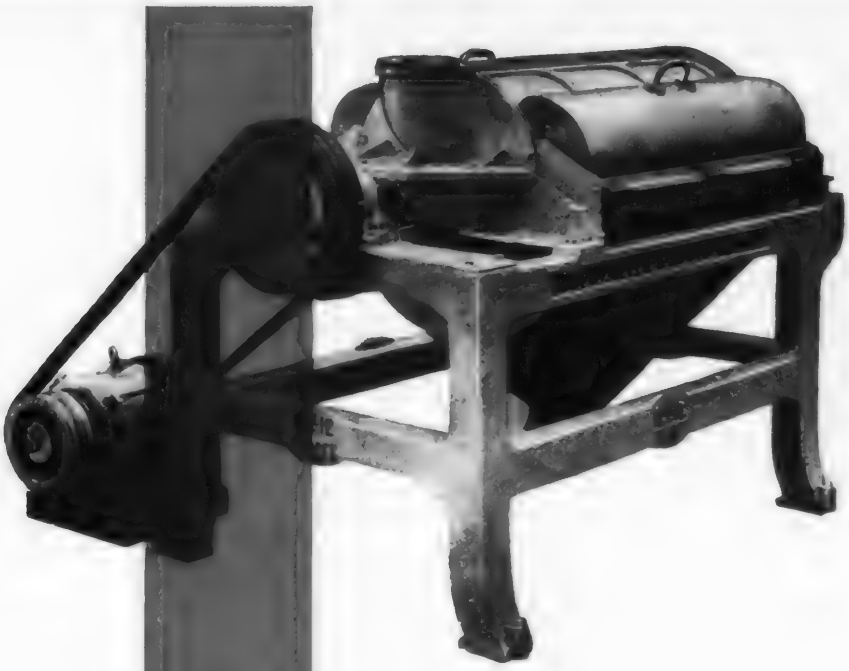
All this is another "plus," added to the established advantages of tinplate as the leading packaging material. Tinplate, being made of sheet steel, gives a product permanent protection in any climate; it is almost infinitely adaptable; and tinplate packs are easy and economical to store and handle.

If you have a packaging problem it will be well worth your while to seek the advice of The Steel Company of Wales Limited. The Company prides itself on giving individual attention to its customers' individual needs. Our specialists will give you most willing help.

THE STEEL COMPANY OF WALES LIMITED

Tinplate Division: CARMARTHEN ROAD, SWANSEA, GLAMORGAN

Telephone: Swansea 51571 Telegrams: Welshplate, Swansea



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A sturdy reliable machine with a tremendous capacity, the Kellie Heavy Duty Pulping machine can easily handle up to 20 tons of material per hour. Food products such as tomatoes, apples, prunes, plums, figs, oranges, berries etc. deftly cycloned, sieved and reduced to a liquid or semi-liquid state.

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The Kellie Heavy Duty Pulping machine is capable of dealing with 10 to 20 tons per hour according to the nature of the product. The machine is equally efficient as a rougher or finisher with the use of interchangeable screens.

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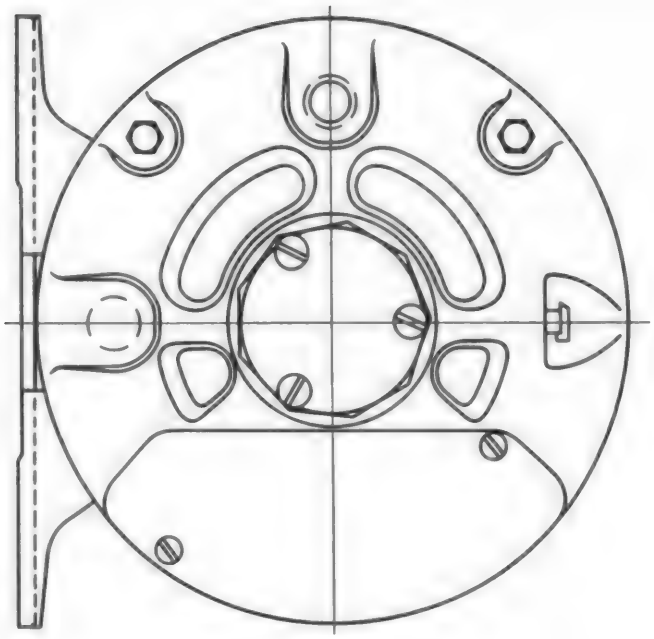

DESIGNING

AND MAKING F.H.P. MOTORS

You, as an engineer, know that there can be no sharp dividing line between designing and making. A good design incorporates experience gained in making, testing and installing similar equipment in the past. And, of course, it is also shaped by the experience of users of earlier designs, under a variety of conditions that could not be simulated in any test laboratory.

To a long-established company such as Crompton Parkinson this process of feed-back of information to the designer is fundamental.

Crompton Parkinson are the first Company in Great Britain to design and put into production a complete range of F.H.P. motors to comply with draft BS.170, frame B.48. This specification requires a 3" centre height, limiting the motor diameter to 6" maximum. This has been achieved by designing a special foot.

In addition, a new form of insulation allows of smaller slots and consequently more iron round them. By careful electrical design, the flux is uniformly distributed so that the iron is fully utilised. Consequently we have been able to get a lot of power into a small space. A very efficient ventilation system keeps the temperature well within the BS. limits. Again, a detail from experience: the terminal boxes have been made very roomy and the terminals large, with screwdriver slots. The 'Marathon' large-capacity sleeve bearings permit all-angle mounting, without oil leakage. These little motors are in fact an excellent example of the interplay of theory and experience in good design.

Crompton Parkinson LIMITED

Member of
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One of the Five British Nuclear Energy Groups.

Makers of Electric Motors of all kinds, A.C. and D.C. Generators, Switchgear, B.E.T. Transformers, Cables, Instruments, Lamps, Lighting Equipment, Batteries, Stud Welding Equipment, Traction Equipment, Ceiling Fans.

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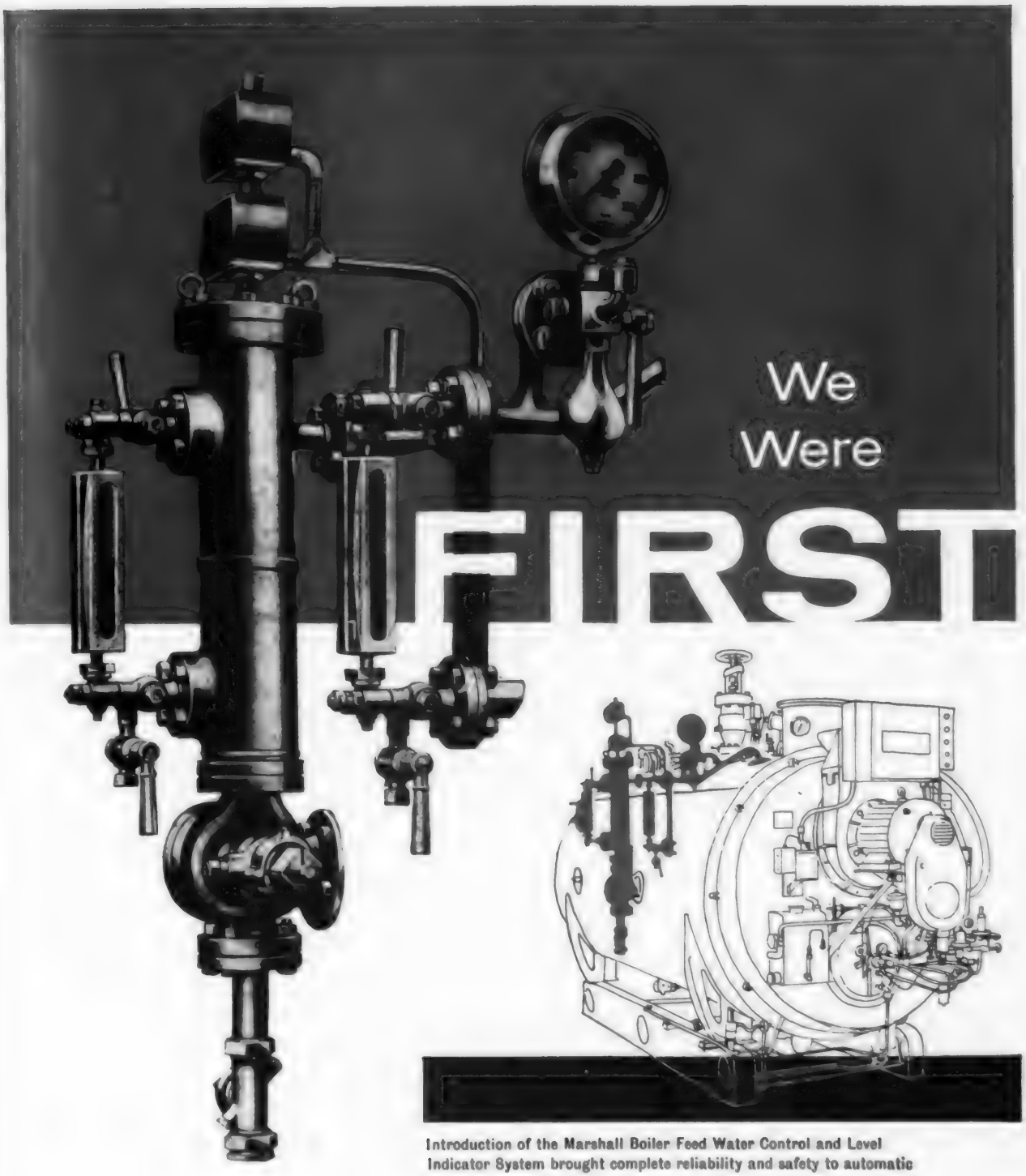

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This completely foolproof equipment, conceived and developed at Marshall's Gainsborough works, is exclusive to Marshall-built Packaged Boilers.

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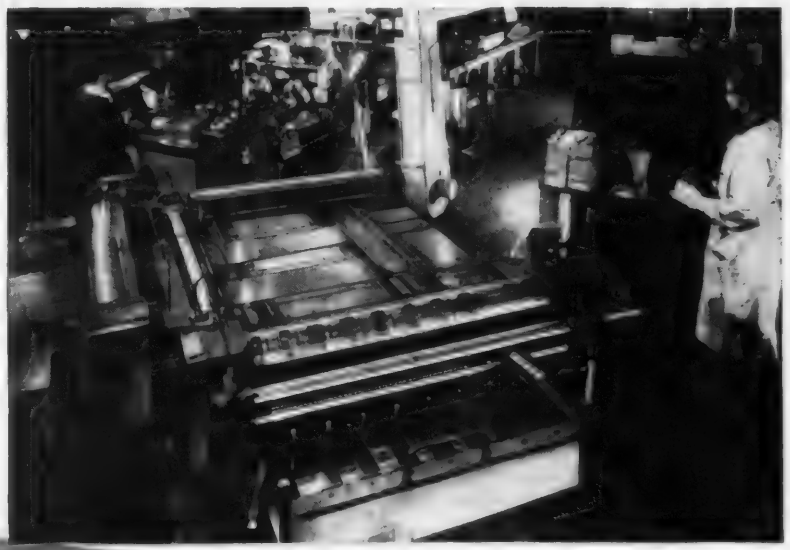
BLISS *High Speed* CANNING LINE



Photographs by courtesy of C.W.S. Bedford.

E. W. Bliss (England) Limited are manufacturers of high speed canning lines and have installed much of the can making machinery used in the new Kitt Green factory of H. J. Heinz Company Limited.

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Broadbent high duty sugar centrifugals in a modern sugar factory.

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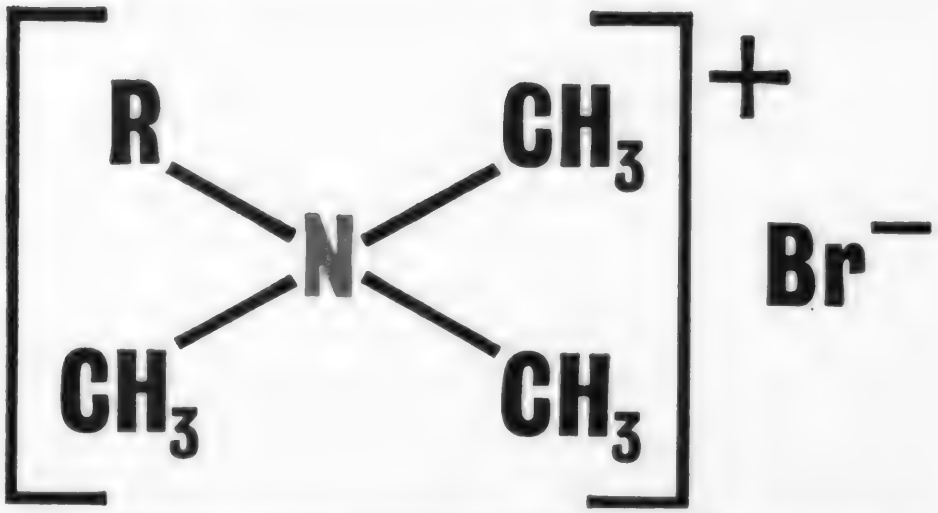
VANTOC AL



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Highly effective against yeasts and a wide range of bacteria in mixing pans, syrupers, pipe lines, fillers and bottle stoppers.

Vantoc CL has superior resistance to hard water and organic matter, and is recommended when a more concentrated product is required.

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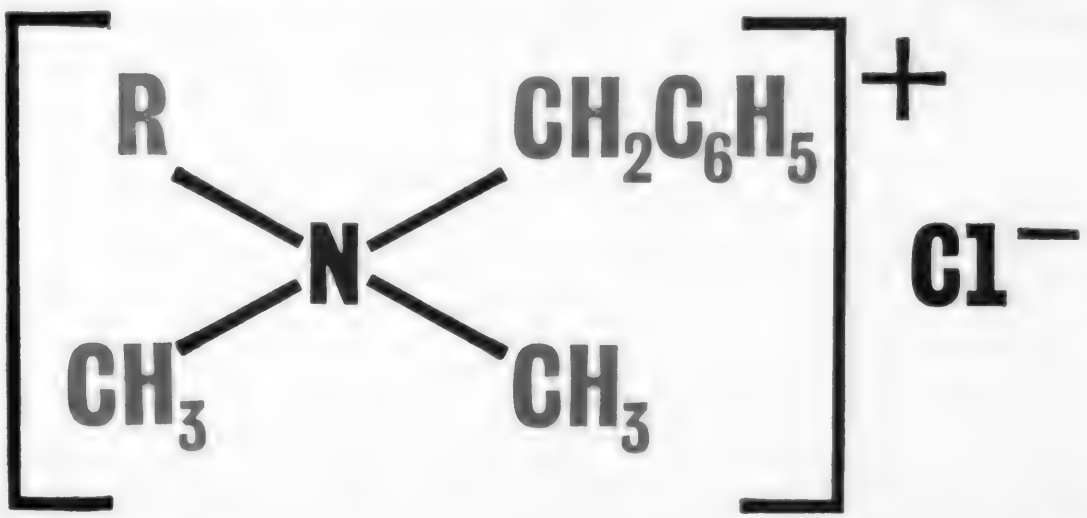
VANTOC CL



NEW!

The Autocap Tin

DESIGNED FOR THE PACKER

END DOUBLE SEAMED

BOTTOM FILLED

EASY TO OPEN AND RECLOSE PROPERLY

A SLIP LID TIN WITH A DIAPHRAGM

- An unrestricted filling orifice—no ledge or trap for contents. Ideal contour for high-speed vacuum filling.
- Bottom component self stacking (but non-wedging) for hygiene, safe transit and automatic feeding.
- A closure already assembled and complete. A slip lid is not an easy component to feed and apply automatically.
- 'Capping' by double seaming is the well tried food can method of sealing. Service facilities and machinery cover a range of speeds from 10 up to 300 per minute, faster if needed.
- By its design the body and lid may be all over decorated—labelling or taping of the lid is not necessary. The lid itself is lightly tack sealed to the body.
- Excellent re-closure performance. Any re-closure is no better than the user chooses to make it. This lid invites correct replacement. Rim of paper and adhesive left after opening 'cushions' and assists efficiency of re-closure.
- A sift-proof tin from three (instead of the traditional four) metal components costing less than other packs.
- Heat sealed diaphragm presents the contents to the user under a 'personal seal'.
- No opening tool or device needed.

✳ **The protection afforded is best evaluated by test. Misleading conclusions may otherwise be drawn.**

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MB21/32

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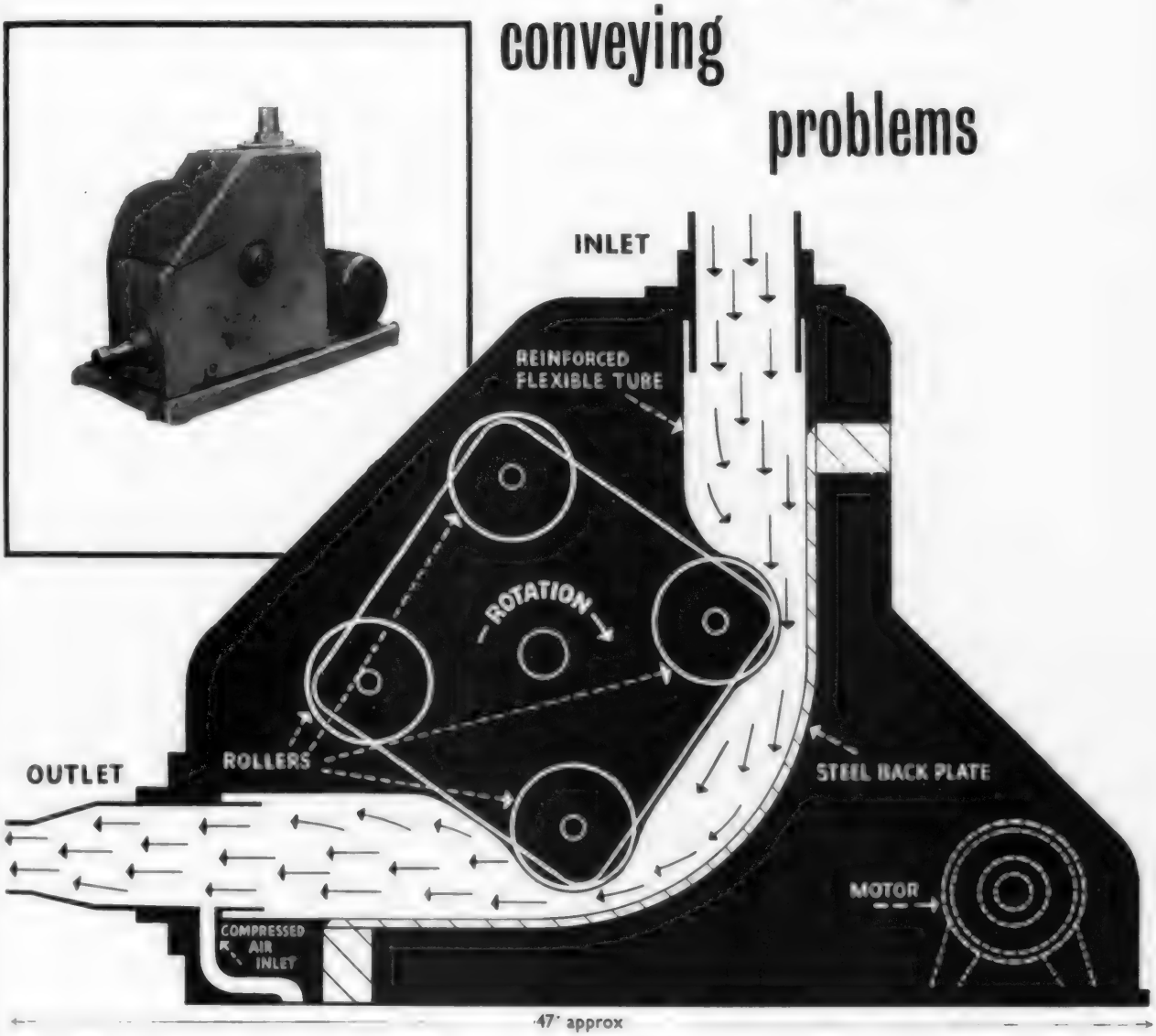

1. **The Simon Squeegee Solids Pump handles almost all types of powdery materials.**
2. **Quantities up to 8,000 lb. an hour are moved economically.**
3. **No damage whatsoever occurs if the pump runs dry.**
4. **Very little conveying air is required, thus eliminating costly dust-collecting apparatus.**

These are only four of the many advantages of the outstanding new Squeegee Pump, a solids pump that has the answers to all short transfer conveying problems.
It cannot burn out if the feed fluctuates or stops, it is neat and easy to install, it does not become clogged by clinging materials. On the Squeegee Pump a rotor with four equidistant rollers squeezes the materials progressively through a flexible tube, compressing and releasing the tube in turn, thrusting the material through in a continuous stream. Distances up to 200 feet are usual.

The Squeegee Pump is entirely new and has money-saving applications in a host of industries.

Send for details today.

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The whitest and purest folding-box board is made from the virgin fibres of Scandinavian spruce.

Unless you specify 'Scandinavian' your box board may contain repulped fibres, with a 'taint' from previous usage, which can affect sensitive products.

'Scandinavian' contains NO repulped material. Pure, odourless, tough and beautiful, no board manipulates so readily, offers such rigidity for its weight, takes print so delightfully, or protects delicate products so well.

'Scandinavian' is brilliantly white—or can be supplied in many colours, with or without special coatings for specific needs. Its exceptionally high bulk means more boxes per ton of board.

pack

sensitive products

in

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PURE FOLDING BOX BOARD

'Scandinavian' folding-box board is produced only by the Associated Box Board Makers of Finland, Norway and Sweden.

Consult your Box Maker or Agents of the FINNISH, NORWEGIAN AND SWEDISH BOX BOARD MILLS
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Place: ARTHUR GUINNESS SON & CO
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In providing a permanent solution to this ventilation problem Colt have added yet another chapter to their record of success—success which has brought repeat orders from many world-famous concerns.

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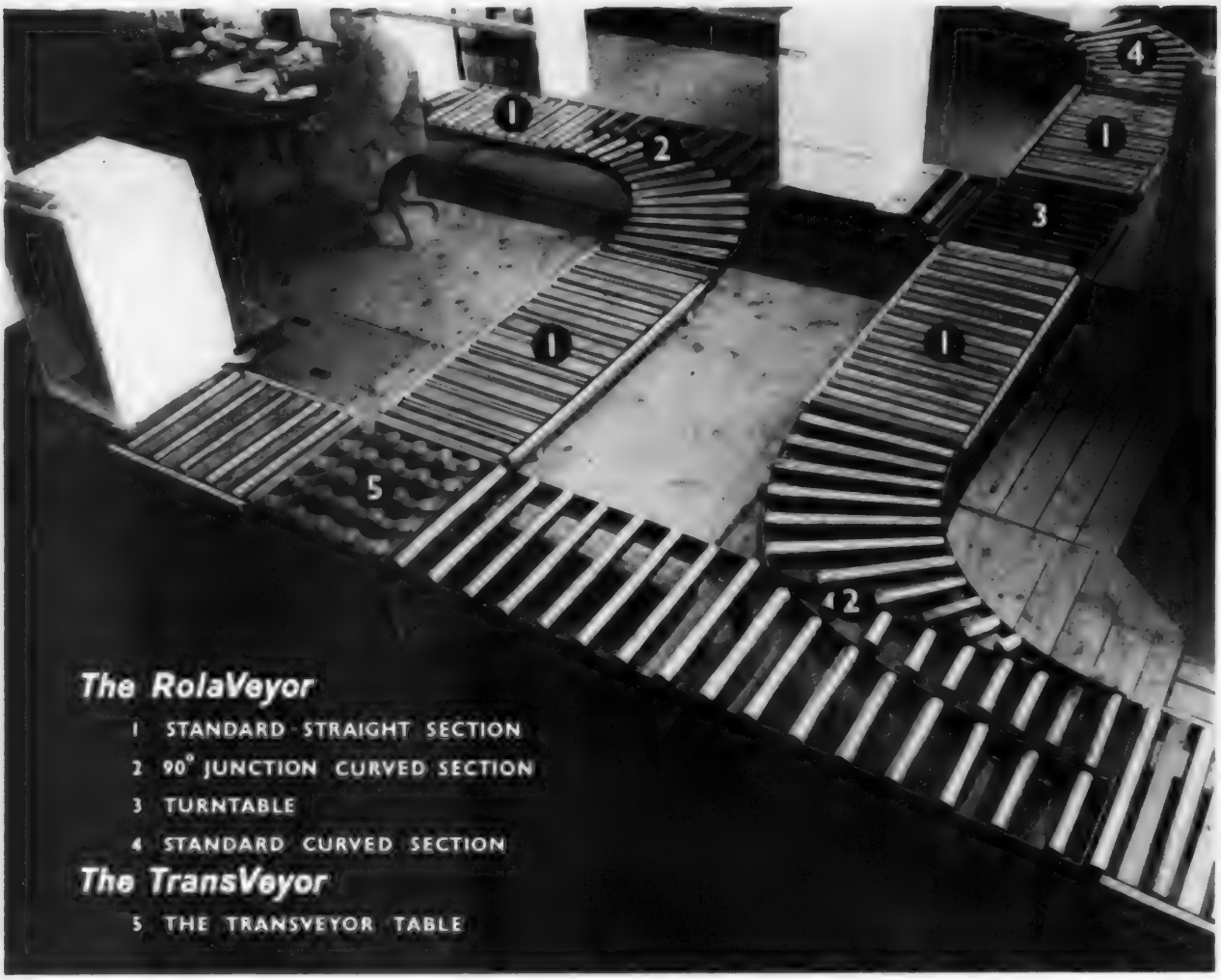

The RolaVeyor and The TransVeyor are illustrated in this plan view photograph of a section of the installation at Electrolux Ltd., handling refrigerators from assembly track at final inspection.

Please write or 'phone for literature or for our Technical Representative to call

AND SEE WHAT COLLIS CAN DO FOR YOU

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—gravity works for nothing!

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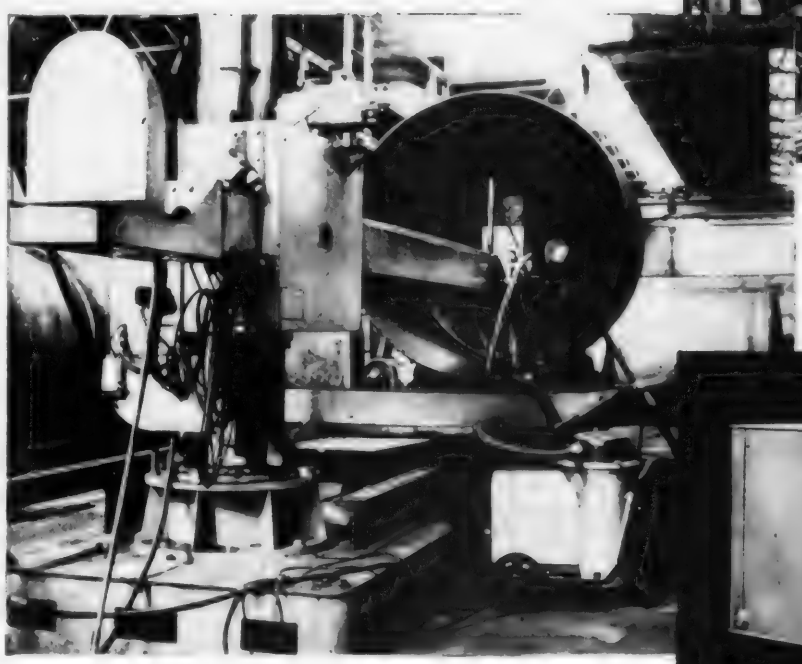

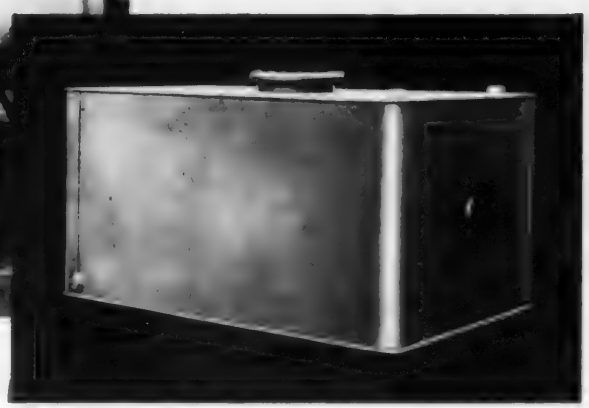

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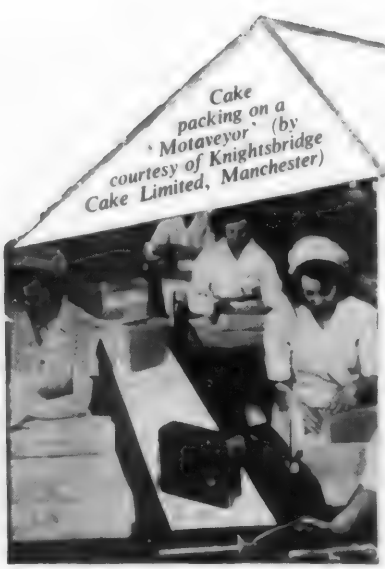
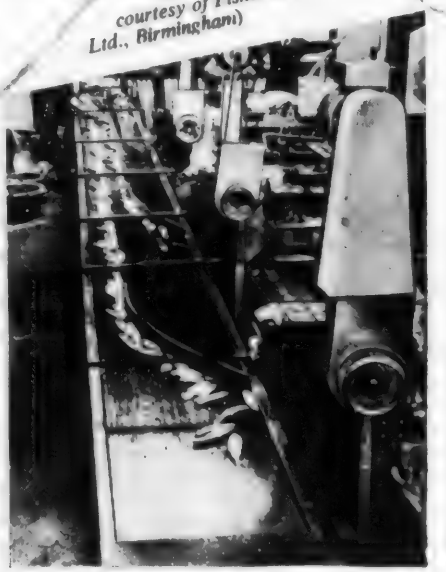


Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birminghani)

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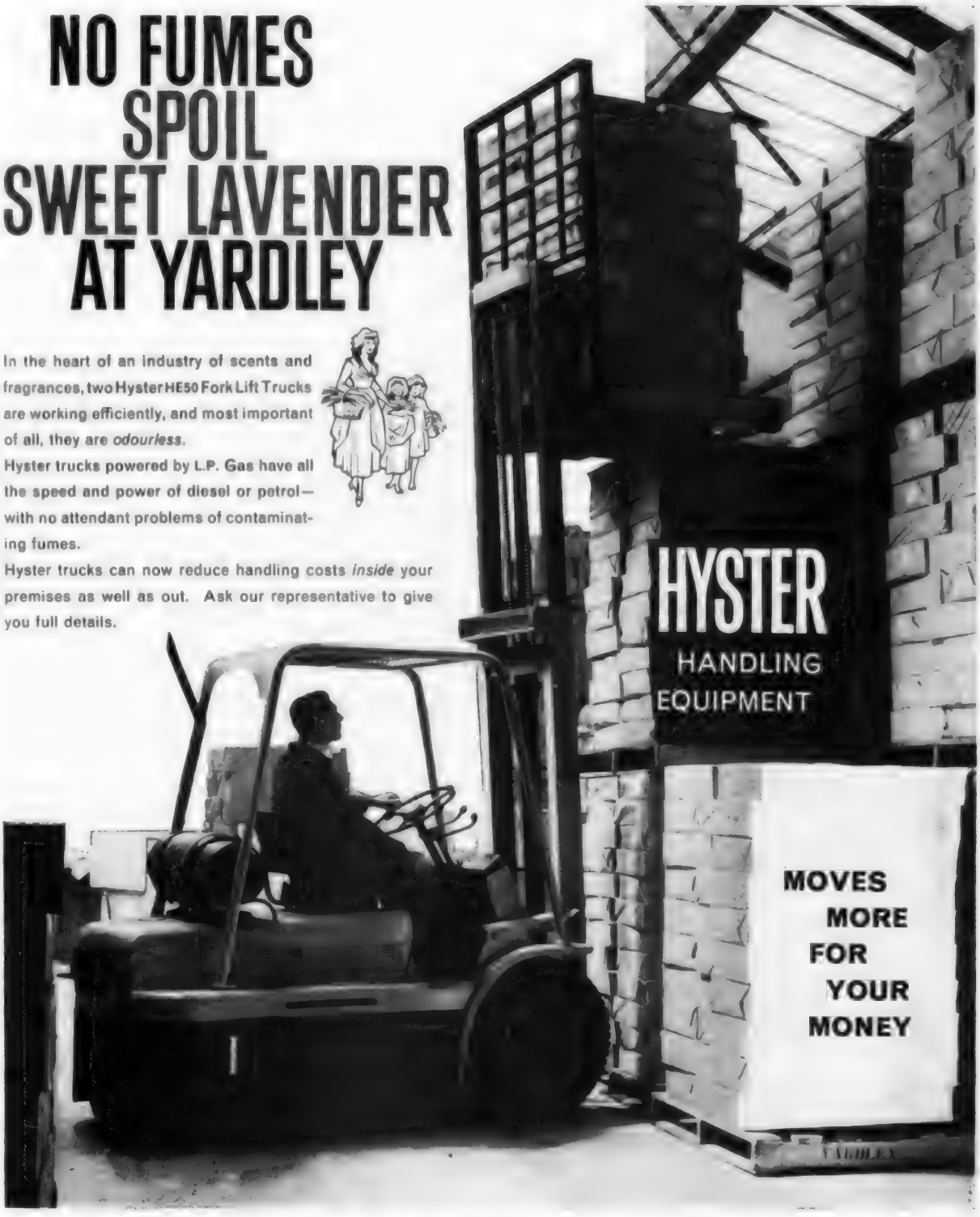

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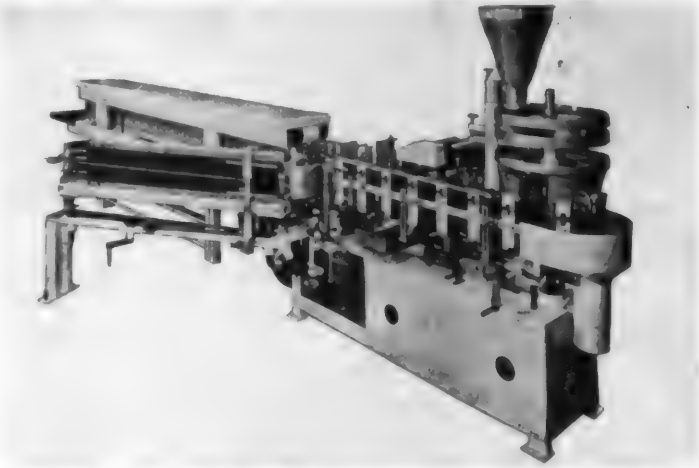

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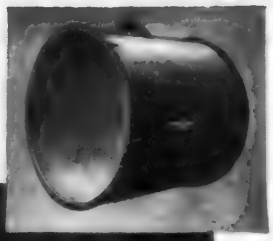

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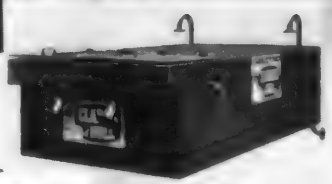

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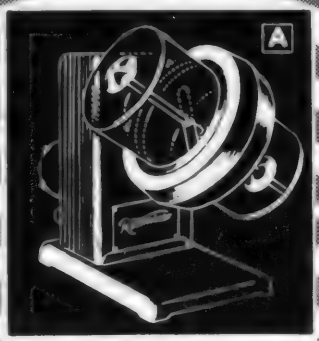

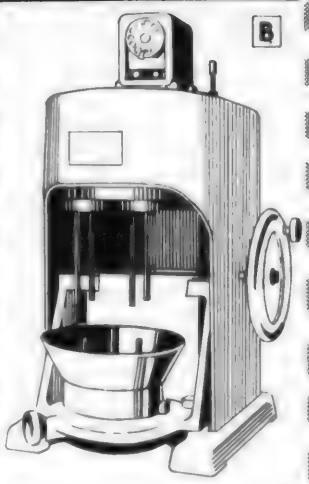

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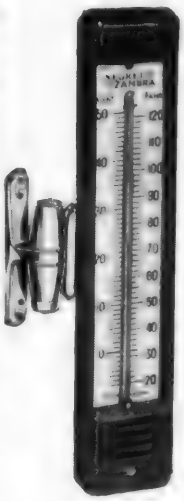

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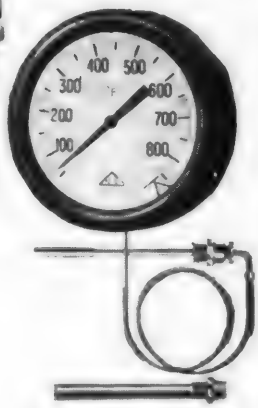

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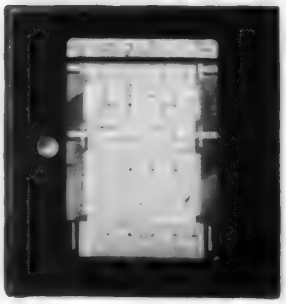

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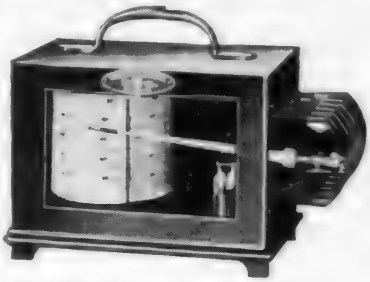

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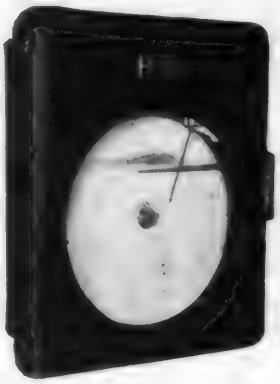

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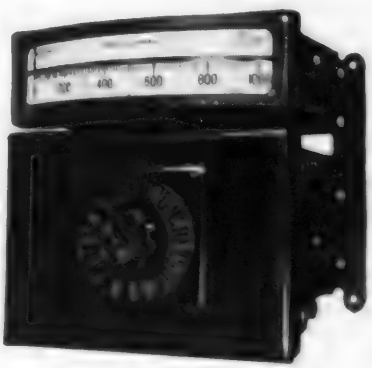

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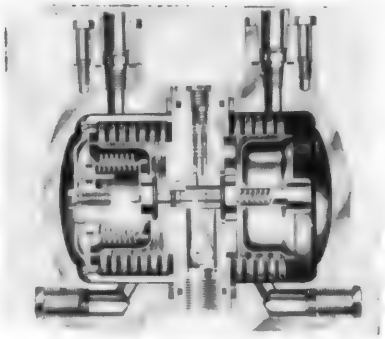

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FOOD MANUFACTURE

Volume XXXV. Number 3 Editor: Anthony Woollen, B.Sc., A.R.C.S., A.R.I.C. March 1, 1960

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The Examination of Edible Oils & Fats (No. 6)

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THE PHYSICAL CHARACTERISTICS OF FATS

Many methods are used in the physical examination of fats, e.g. Melting Points, Setting Points, Softening Points, Penetration Values, Dilatation Values, etc. Some of these methods are objective in character and give reliable information on the nature of the product under examination, they may also indicate its suitability for particular purposes. Unfortunately these methods of determination are lengthy and are not suitable for rapid assessment. Other methods are empirical in nature and it may be said that their chief merit is the rapidity with which they may be carried out ; one example is the Slip Melting Point, which is really a test used by a manufacturer to enable him to maintain consistency in successive batches of each of his products. It affords little information of a fundamental nature.

Short notes on the different methods of examination in common use are given below.

MELTING POINT

Individual preference plays quite a part in selecting a method to determine the melting point of a fat, with the result that there is a variety of methods in use. Fats are mixtures of glycerides which may vary considerably in their individual melting points, with the result that the mixtures do not have well-defined melting points but tend to soften with increasing temperature to the point of complete fusion. It is this fact that has led to the development of numerous methods of determination. Some fats, notably Cocoa Butter and similar fats, exhibit polymorphism i.e. the ability to solidify in more than one crystal form. As the crystal forms can have different melting points, it is essential to adhere strictly to a definite method of solidification and time must be allowed for the fat to assume a stable form before carrying out a determination, in some cases a period of 48 hours is required for stabilisation.

THE SLIP POINT

This method is probably used more than any other. With many fats it is reasonably precise and is used by manufacturers as a control of hydrogenation and by consumers as a check on deliveries. Some products, however, do not give precise results. The chief merit of the test is the rapidity with which it may be carried out ; but the information obtained is only that of a check, and does not afford information on the nature of the fat.

THE SOFTENING POINT

This method was introduced by *Barnicoat* in 1944 and is more precise than the Slip Point giving a good degree of reproducibility with all fats. The time taken by a determination is longer than for a Slip Point but for works control a shortened method may be used with satisfactory results. During a determination the behaviour of the fat under test gives some qualitative information of its nature and it is regrettable that the test is relatively unknown and therefore seldom used.

COMPLETE FUSION

This was probably the first method used for determining Melting Points but is only in limited use now. The method is excellent for natural fats but is more difficult to carry out with modern fat blends. Useful information on the nature of the fat may be obtained during melting and results are reasonably precise. Good daylight is essential for observing the point of complete fusion and this requirement limits the value of the test.

FLOW POINT AND DROP POINT

This method was devised by *Ubbelohde* and is used by Government laboratories. Satisfactory results are obtained but the method has disadvantages in that special apparatus is required, only one determination may be carried out at a time and the time taken is rather long. The method is as follows : the sample of fat in pieces is placed in a small cup with a standard size orifice ; the bulb of a thermometer is arranged so as to be in contact with the sample and heat is applied. The temperature at which the sample is observed to move through the orifice is recorded as the *Flow Point*, and when the first drop of melted fat falls from the cup this is recorded as the *Drop Point*.

LN 62-8058

FOOD MANUFACTURE

Vol. XXXV, No. 3 **March 1, 1960**

More take-over bids?

RECENT amalgamations and take-overs, sometimes spectacular, in some cases bizarre (who would expect Hugon's the *Atora* suet people to take over Thawpit?) give rise to the feeling that here is a business phenomenon which represents a logical, perhaps inevitable, but certainly not always welcome development in the process of economic evolution. The diversity of industries concerned and the simultaneous flourishing of take-over bids in all sections of it reinforce this opinion. This being the case, we can expect further amalgamations. Is this a good thing or a bad? Will the process continue like the coalescing of globules of mercury until we have all become one vast blob?

No simple answer to these questions can be given because businesses merge for a variety of reasons. In the case of some, the simple profit motive impels. More often than not, however, the reasons are much more complex. The enormous cost of the research and development necessary to keep a firm's head above the waters of competition is frequently beyond the resources of a single organisation, and the merging of mutual interests is frequently an act of sheer self-preservation. The classic example is the formation of I.C.I. in the 1920's to meet the competition of the German chemical industry.

Another reason, typified by the recent amalgamation of Cow and Gate with United Dairies, is to combine the variety of products of one firm with the marketing resources of the other. We incline to the view that voluntary mergers, where each party benefits, are a good thing, and that forcible take-overs, where the share capital of a business is bought up by a more powerful interest without consideration of the board's views, are bad. Unfortunately, many take-overs seem to be of the latter kind.

Does this mean that the day of the small business is over? Far from it. In our expanding and prosperous economy there is room for the big and the small, and it will be a sad day when there is no more room for the small man. It is encouraging that the number of new companies registered in 1959 was an all-time record, a healthy sign in these days when bigness and uniformity lay their heavy weight on society. It is worth remembering, too, that political winds are fickle; if today the fresh breezes of freedom blow lightly on our economy, it may not always be so. Experience has shown that the larger a concern is, the greater is its attraction for the covetous hands of political theorists who would have everything in the cramping grip of state control.

Pest killers and the public

THE hazards, real and imagined of pest control chemicals have been given prominence in the press recently; we ourselves drew attention last month (p. 48) to one of these reports, which was concerned with a consignment of apples from abroad. Much of what has appeared in the lay press has been somewhat emotive and uninformed, and to correct an unbalanced picture, statements have been made by two manufacturers' representatives, Mr. George Huckle, chairman of the Association of British Manufacturers of Agricultural Chemicals, and Dr. E. F. Edson, chief medical officer and director of research of Fisons Pest Control.

Mr. Huckle said that every year something like £140 million worth of agricultural crops are lost to our economy by weeds, pests and disease, of the order of 10% of the total value of agricultural produce in the U.K. One can be reasonably sure that in less developed countries the loss is very much greater. This loss is one which the use of chemicals can substantially reduce. This does not mean that such materials are used indiscriminately, and Mr. Huckle pointed out that before any crop protection chemical is marketed in this country, the risks associated with its use are most carefully examined by a committee of the Ministry of Agriculture, and safety precautions thought to be necessary by this committee are accepted voluntarily by the industry.

The alternative to the use of pesticides would be starvation for many; those who would suffer most would be the peoples of densely populated Western Europe whose living standards demand the maximum yield from every acre. Without pesticides, said Mr. Huckle, the civilised world would have to revert to a rationing system far more rigid than during the war, the rations moreover being in the form of wee-

vil-infested flour, scabby and maggoty fruit, and disease and pest-ridden vegetables. A truly frightening prospect! However true Mr. Huckle's statement may be, and we do not doubt it in the least, we feel that his comparison of the present state of crop protection chemicals with that of the motor car 50 years ago, when the red-flag man walked ahead, is somewhat unfortunate; the motor car is not an unmixed blessing, as road accidents testify.

Dr. Edson's theme was that food had never been more plentiful or of better quality, and farms and country-side in better condition, than today. He pointed out that agriculture had many more dangers than those from chemicals, and accidents from machinery, animals and weather caused more than 100 deaths every year in this country alone, whereas the total number of deaths due to agricultural chemicals since 1946 had been 13.

It must, however, be remembered that the bulk of Britain's food comes from overseas, often from countries which do not have the same regard for hygiene or safety that we have here. Vigilance, therefore, is and always will be necessary.

Toilers of the hills

WHEN the housewife nonchalantly opens a can of soup or peas and then discards the empty can into the waste bin, she seldom ponders the fact that between it and the iron miners and founders of the Welsh hills there is a continuous link forged in toil and sweat going back to Roman times. The iron mines were the foundation on which the Welsh tinplate industry was built over more than a century, and since the start of canning, this industry has supplied tinplate for can-making all over the world.

This journal is particularly proud of the fact that since its first issue in May, 1927, its connections with the canning industry have always been very close. Indeed, more than one canning firm has acknowledged with gratitude the technical help given by Mr. Leonard Hill and by the editorial staff which, it is no exaggeration to say, has enabled them to stay on their feet. Our second issue, dated June, 1927, contained an account of the Presidential Address of Sir Edgar Jones to the National Food Canning Council formed the previous year, and it is therefore with great pleasure that we welcome a book* from Sir Edgar's pen written in memory of those who worked through more than a century on iron, steel and tinplate in the villages of the Welsh hills and valleys.

The book describes the history of Welsh iron and tinplate, the transition from iron to steel, and the development of the canning industry. It describes the steps leading to the establishment of the National Food Canning Council, and how the far-sightedness of a young man named Robert Barlow, who was intimately concerned in the creation of the Metal Box Company, was of immeasurable value during the last war in feeding the country and provisioning allied forces all over the world.

The canning industry has had its ups and downs. The ruthless American attack on the Welsh industry in the 1890's caused much distress, and foreign dumping of canned goods in this country during the slump of 1932-33 put many firms out of business. In the tinplate industry, reorganisation and changing demand has caused the disappearance of hand skills and crafts. Whatever the future may bring, it is fitting that there shall be a memorial record of the past.

* *Toilers of the Hills*. By Sir Edgar R. Jones, K.B.E. Hughes, Pontypool, 1959. Pp. 56. 10s. net.

Transport monopoly

DURING the period of the bus strike in London last May twelvemonth, lateness almost vanished, absenteeism dropped to a low level and transport for workers ceased to be a problem, say Clarnico, Ltd., of Hackney, London. The reason for this startling improvement in attendance and punctuality was that by the judicious use of hired vehicles and the formation of a shuttle service with their own vans, the firm were able to provide efficient transport for those of their employees who would otherwise have had to use the local bus service.

According to Mr. J. Stewart Choate, Clarnico tried to exert pressure on the London Transport Executive to improve the local transport facilities for their employees, but without avail. On the grounds of economy, the L.T.E. refused to increase the existing service and at the same time rejected an alternative suggestion by Clarnico that an independent coach service should be run for their employees by a coach operator, a reasonable fare being charged. The L.T.E. did, however, take notice that the proposed service would make use of double decker buses instead of single deckers, and did in fact introduce them, but without much difference to the service.

Clarnico felt, reasonably enough, that if L.T.E.'s refusal to increase the service on the grounds of economy is valid, there should be nothing to prevent a private coach company providing the additional services required. They accordingly joined the Passengers' Protection Association, becoming the first industrial member.

Welcoming Clarnico to the association, its president, Mr. Frank Davis, a Finchley councillor, said that for years the transport of the firm's 1,000 employees had been a constant headache to the management, but despite doing everything in their power to alleviate the position, so far they had had little success. Such restrictive practices by a public corporation are very difficult to deal with, because the corporation unfortunately has the power to shield it-

self from the commercial competition which sharpens efficiency and cuts costs. We have watched Mr. Davis's valiant fight against the L.T.E. bumbledom with interest and admiration, and feel that if there were more people with his independent vigour, the tentacles of bureaucracy would not cling so tightly.

Hands off the tuck shop!

CAMBRIDGE schools' chief dental officer Mr. James Toller will make himself unpopular not only with school-children but with confectionery manufacturers if he persists in his opinion that "the harm done" by eating sweets "is incalculable." Saying that physical education and tuck shops in schools are incompatible and contradictory, he asked for the sales of all food other than school meals to be banned during school hours.

He has some hard words to say about the sweet-eating habit—"bad and dentally dangerous," he says. "The habit of eating what is in effect a large number of dentally dangerous small meals between the main ones is increasing and should be diminished. It is regrettable that this habit is being actively encouraged by school tuck shops."

We doubt not that many children eat too many sweets, but we should think the effect would be worse on their tummies than on their teeth. As pointed out in our January issue (p. 12) there is little solid evidence that eating sweets has much to do with dental caries. We doubt whether the banning of tuck shops would have much influence on children's sweet consumption, which, we imagine, is directly related to the amount of their pocket money. If sweets cannot be bought in school, they will be bought outside, and why should not schools make a little profit out of what is a perfectly normal schoolchild propensity?

Tuck shops are, as Mr. Toller admits, a "hallowed tradition" which we would be sorry, for purely sentimental reasons, to see disappear. The "harm" they do surely must be outweighed by the pleasure they bring; perhaps the inquiry into the tuck shops of Cambridge, which Mr. Toller has persuaded his education committee to instigate, will reveal that their turnover is much less than he thinks.

"Elementary, my dear Watson"

MOST of the shelf life of any product should be spent in the hands of the retailer and the consumer, more especially the latter. The aim should be to place the product in the consumer's hands while it still has most of its shelf life potential and its best quality. This may be obvious, but the obvious needs restating occasionally, and both the retailer and the consumer need to be impressed with the importance of adequate refrigeration and the relationship between shelf life and quality.

According to Dr. James B. Evans, head of the American Meat Institute Foundation's department of bacteriology, there are only two factors which need to be considered in achieving the maximum shelf life in a meat product, and these are sanitation and refrigeration. Sanitation may be said to control the number of bacteria implanted in a product, and to some extent the flora. Refrigeration is the main line of defence after the onset of contamination, for it has been shown in practice that a product will keep twice as long at 32°F., for example, than at 40°F. when contaminated to the same extent. Another point emphasised by Dr. Evans was that as the storage temperature is reduced, the importance of the contamination level is magnified because the bacteria multiply instead of reproducing.

It may seem a little trite to say that there is no magic in producing foods with a good shelf life; all that is needed is a combination of good housekeeping and temperature control. Even in the U.S.A., possibly one of the most hygiene-conscious countries in the world, they still think it worth-while to trot out the elementary rules and to remind people of the two-edged sword which cuts bacterial spoilage.

Broilers again

THIS broiler business is very confusing. A little while ago, the British Broiler Growers' Association held a press conference to launch the Chicken Information Council and to announce that the term "broiler" would be officially discouraged. We have never had much liking for it; a transatlantic importation, it is so easily confused in the public mind with "boiler," yet for want of a better term to describe 10 week old intensively-reared birds it has stuck.

If the leading lights of the broiler industry want their products to be known as chickens, they do not seem to be going the right way about it, for they still refer to "broilers" in all their literature and lectures. The hope that "broiler" will be restricted to the technical and trade people, while "chicken" will circulate among the lay public seems to be optimistic, for we still see references to broilers in the national press. A recent article in the *Daily Mail* is a case in point; this article brings up the hoary topic of broiler taste, maintaining in spite of the vigorous denials of the broiler interests that broilers do not taste as good as genuine old-fashioned chickens.

Ever since we quoted the *Daily Telegraph* on the subject (see October, 1959, p. 374), we have been approached at various times (see last month's issue, p. 79, where we printed a letter from the Executive of the Chicken Information Council). What is the truth about broiler taste? Do they, or do they not taste as good as they should? We have reports of

tests by impartial observers who are said to be unable to distinguish between intensively-reared birds and chickens reared on the open range when served with portions of each on a plate; we have newspaper reports that "domestic science experts" agree that broiler taste is inferior. Between these conflicting views we do not propose to judge; we have always thought the flavour of a young chicken, however reared, rather insipid anyway.

Broilers and the spread of infection

CONCENTRATIONS of young birds in crowded broiler houses, which sometimes contain more than 15,000 birds, will facilitate the spread of infection should carriers be present, said Dr. J. H. C. Walker, Director of Maidstone's Public Health Laboratory at a recent meeting of the Royal Society of Health in Canterbury. He said that it was difficult to escape the conclusion that some human infections had been caused by poultry. In one area of the country, 82 cases of salmonella infection were reported in broiler houses in 1957, and salmonellosis was the third commonest cause of mortality.

When outbreaks of salmonellosis occur, some of the survivors may become carriers and remain so for a year or longer; adult birds exposed to infection do not always exhibit symptoms, but may harbour the organism for long periods. This raises the question: does cooking render an infected bird sterile? Reliable scientific opinion indicates that it definitely does not; furthermore, contamination may be spread from uncooked birds to other foods during handling.

In the U.S.A., poultry are regarded as the largest natural reservoir of salmonellae, and during the investigation of a number of outbreaks of food poisoning, 30% of the incidents and over 40% of the cases were found to be associated with poultry, according to Dr. Walker. In this country the situation is different, because of the much lower proportionate poultry consumption, and between 1952 and 1958 only one outbreak of salmonellosis definitely associated with eating poultry was recorded in the country. The rapid increase in broiler output, however, may alter the position, and one has only to compare 1953's negligible broiler consumption with last year's estimated total of 75 million birds, which itself was 30 million more than that of 1958, to realise that by 1965, when the industry anticipate an output of 200 million birds, the effect on public health could be quite different from what it is today.

The broiler industry is very alive to the position, and fully realises that the most humane and hygienic conditions of rearing, killing, processing, distribution and marketing are of paramount importance. No less so are adequate and effective facilities for inspection and bacteriological examination.

Not a food, just a treat

How often have we not gazed upon these advertisements which proclaim in no uncertain terms that ice cream is more than a treat, it is indeed a food? Now we have the *Shopper's Guide* telling us that this is a lot of nonsense, that although it contains calories (which all foods supply) it contributes little else to the diet, and that in consequence there is little justification for that well-known advertisement, "More than a treat—a food."

Four well-known brands of ice cream—Lyons, Walls, Eldorado and Neilsons—were selected for detailed examination, and both the ordinary and the dairy ice creams were compared. Taking the dairy kind first, the most remarkable feature was the variation in value for money; on average the purchaser may get half as much again by weight of one brand as of another for the same price, although it was emphasised that the weight of the individual samples varied so much that one could not be dogmatic.

Analysis figures show little appreciable difference between the brands, both for dairy and ordinary. An advertisement claiming for one brand a specific equivalent milk content was conceded to be technically accurate. The old controversy concerning the relative merits of dairy ice cream and ordinary was almost brushed aside; nutritionally, there is no significant difference except that the dairy variety contains vitamins A and D not found in vegetable fats, although the amounts present are negligible.

If the nutritional value of the four kinds of ice cream is low, at least in every case it is well above the minimum standard, which was laid down in 1951 when materials were scarce. Fat contents in each case were more than twice the statutory minimum.

Attention was drawn to the problem of overrun, which is the increase in volume caused by aeration, and which makes unreliable any claims for the product based on volume alone. Some North American states have regulations which limit the amount of overrun which can be introduced into the liquid mix, although so far in this country, no satisfactory form of control has been agreed, even though a Government committee reported in 1957 that "from the standpoint of the consumer, an ice cream standard which does not in some way take account of overrun is incomplete."

What does all this mean? Are manufacturer's claims regarding the nourishing qualities of their products accurate? Or has *Shopper's Guide* thoroughly debunked British ice cream? We incline to the view that the truth lies somewhere in between. At any rate, reputable manufacturers are making a product of a quality greatly exceeding the legal minimum, although this may indicate that it is time legal minimum standards were revised.

One of the Torry type smoking kilns, with two bogie-loads of herring waiting to be smoked. Each kiln holds four bogies or 120 stone of fish.

Mac Fisheries' Factory at Fraserburgh

How modern techniques are applied to a traditional industry

Mac Fisheries were pioneers in the quick-freezing of fish. Their factory at Fraserburgh, in the north of Scotland, which we recently visited, has their largest freezing plant and the latest type of smoking kilns, and is one of the few fish factories in the country where quality standards are enforced by qualified laboratory staff. This exclusive article gives the reasons why, in spite of generally declining fish consumption, Mac Fisheries are confidently expanding their operations.

WE have more than once commented in these pages that the state of the fish industry in the United Kingdom leaves something to be desired, and that much could be done to improve it. It is a sad fact that whereas the world consumption of fish is rising yearly by about 5%, consumption in these islands is declining, in spite of the improved catching and processing methods employed by the more enlightened firms. It is an unsatisfactory state of affairs that the oceans, which cover four-fifths of the world's surface, and which are incalculably rich in animal life, should contribute only a few per cent of the world's food. Whereas land food supplies are highly organised and are subject to intensive scientific study and control, the position with regard to sea-food is reminiscent of the Stone Age; the quarry, instead of being husbanded, is hunted in a manner likely to ensure the rapid elimination of the more valuable species unless efforts are co-ordinated on a scientific basis for the benefit of all. The time must surely come soon when the waters are farmed instead of plundered to feed the world's rapidly increasing population.

One of the most progressive of our large processors is Mac Fisheries, Ltd. In an industry where scientific methods of quality control are often conspicuous by their absence, this firm is notable for its quality standards and the way in which these standards are enforced by laboratory control. Unlike many other countries whose governments have legalised certain standards of handling, processing and marketing of fish, Britain has no official standards. Mac Fisheries, therefore, have set their own, which extend to the quality of the fish accepted, the processing methods and the quality of the finished product.

Fraserburgh factory

We recently saw for ourselves how these standards are applied in practice when we visited the company's factory at Fraserburgh in

northern Aberdeenshire. A new extension to this factory, opened last July, has brought employment to an additional 230 people during the herring fishing season; at the season's height, from June to September, about 700 people are employed, and although the work is somewhat seasonal, the number employed at the factory never drops below 300. This has given very welcome added employment to the Scottish fishermen and their families, besides ensuring more stable prices for the fishing fleet and a higher standard of product.

In the words of Mac Fisheries' chairman, Mr. Gordon S. Black, operations at Fraserburgh have been expanded because the company are confident that there is a great future for planned and co-ordinated effort in fish processing and marketing. Although various kinds of white fish and shellfish are processed at the factory throughout the year, the main object of the new extension is to produce kippers, and for this purpose new smoking kilns of the Torry type and other equipment have been installed, which now allow the factory to handle up to 140 tons of fish per day. Cold storage capacity now totals 350 tons, and the factory today has the largest quick freezing capacity of any plant in Scotland. The company has other plants at Aberdeen, Lerwick, Grimsby and Hull.

There is no doubt that the advent of quick-freezing has brought about a revolution in the fish industry, and in this Mac Fisheries were among the pioneers. It is significant that at the present time practically all the factory's white fish trade is in frozen fish, and very little "fresh" fish is handled.

The company was established by the first Lord Leverhulme in 1919 in the Isle of Lewis, and in the years that followed, such firms as John Woodger, first processors of the kipper, and Stanley Pibel joined the organisation. The Fraserburgh factory, where traditional smoking had been carried out since 1921 (and still is, although on a declining scale as the new Torry type kilns replace the old smoke houses) was taken over in 1945, and in that year the first quick-freezing plant was built. At that time, the factory employed about 18 girls and 8 men from June to August. As already mentioned, the factory now employs up to 700 people, and has become one of the major Scottish fish factories.

This picture shows white fish being filleted.

Fish supply

Fish are caught over a wide area and are bought for the factory in the open market. During the season, fish are landed at all hours of the day and night, and are brought into the factory throughout working hours.

Although the main bulk of the factory's output goes to the firm's main distribution centre at Finsbury Park, London (which is conveniently situated alongside the main railway line from Aberdeen), a considerable export trade is carried on from Fraserburgh, Scottish kippers being one of the main products.

Herrings, of course, form the main bulk of the fish handled by the factory, and by the use of kippering machines, on an average about 40 tons per day of these are turned into kippers, both boned kippers and kipper fillets. White fish handled, besides herring and mackerel, include whiting, haddock and cod, and averages 40 to 50 tons per day, rising to about 70 tons at the height of the season.

In recent years, the prawn delicacy known as scampi has been greatly popularised by the catering trade, and during our visit a large consignment of prawns was being shelled by women working on either side of one of the long filleting tables.

Filleting of white fish

One of the principal operations in fish processing is, of course, filleting, and this is largely performed by hand, as although machinery exists for doing this, no one machine can handle the wide variety of sizes encountered.

Filleting is carried out at long tables, mostly by women. The fish are brought to the recessed centre portion of the tables, where they are continually washed by jets of water. The filleters work with deft movements on the slabs, taking the fish from the pile in the centre, putting the filleted cuts into metal containers and the offal, which is sold for conversion into fishmeal, into receptacles under-

Brining of herring before smoking. (*Left*): **The fish, having come down the delivery pipe between the women on to the conveyor belt, are being inspected and trimmed before being taken to the brine tank.** (*Right*): **The trough in the foreground conveys the fish to this brine tank along which they are moved by slats carried on endless chains.**

neath. The containers from each filleting line are weighed and the yield, based on the weight of unfilleted fish, is obtained.

Freezing plant and cold stores

The freezing plant consists of 12 Birds Eye type 15 plate freezers with refrigeration provided from a plant comprising 3 mono-block ammonia compressors, each powered by a 140 h.p. electric motor. The capacity of each cabinet at normal loading is 60 stone, and freezing temperature is −28°F. The various types of pack require different freezing times; 5 lb. packs of kipper fillets, for example, are frozen for 3 hours, while 8 and 14 oz. consumer packs of white fish only require 1½ hours.

The two cold stores have a total capacity of 350 tons, one being of 200 and the other of 150 tons capacity. Their contents are maintained at a temperature of −10°F.

Kipper production

Much of the kipper section is new and a considerable amount of the processing is mechanised. The fish are prepared by automatic boning machines; from these the fish pass down conveyor pipes to an inspection table from which a conveyor takes them to an automatic briner. This consists of a long tank through which is continuously recirculated a coloured brine solution.

The fish drop into one end of the tank from the belt conveyor and are conveyed along the tank by a series of baffles mounted on two endless chains passing over pulleys at each end of the tank. The fish traverse the length of the tank, and at the other end they are guided on to an inclined conveyor which lifts them out of the tank. From the brining tank the brined fish are removed by women who thread them on to sticks and place the loaded sticks into the racks of the bogies on which they are later wheeled, after a suitable draining period, into the smoking kilns.

Smoking

There are two kilns of the type which was developed at the Torry Research Station, Aberdeen, and which have been described before in this journal (see February, 1959, p. 49). Each kiln holds 4 bogies or 120 stone of fish. Smoke is generated in external burners using oak dust as fuel, the rate of burning being controllable. Each bogie is weighed before entering the kiln, again after 1½ hours smoking, and finally when smoking is complete, usually after 2½ to 3 hours. The total weight loss for correct smoking should be 12%.

The smoking process is very carefully controlled. The smoke temperature is thermostatically kept at 80°F. by two banks of electric heaters, and is recirculated through the cabinets. One-sixth of the smoke recirculating through the kilns is drawn off to waste, so that on an average the smoke circulates five times.

Besides taste, the characteristics of a well-smoked kipper are firmness, even colour and gloss, and the fat content after smoking must not be less than 12%.

At the height of the season, it is necessary to put into use the five traditional kilns which the factory still has. They hold 100 crans of fish (1 cran = 20 stone) and consist of vertical smoke houses extending over two floors. The fish are hung in racks, a fire of chips and heavy sawdust is lit underneath, and smoking carried out overnight. These kilns are in an older separate part of the factory, and after being filleted, weighed and packed, the fish are taken to the main factory for freezing. It is worth noting at this point that kipper fillets are filleted after smoking and not before.

When all smoking facilities are in use, 400 crans can be smoked every 24 hours.

Packing and despatch

Kipper fillets are weighed in metal trays and wrapped by hand in cellophane film, then packed into cartons at the rate of ten 8 oz. (nominal) packs per 5 lb. carton. The wrapping workers put the wrapped fish on conveyors which take it to the packers.

Retail packs of white fish are

A general view of the white fish filleting and retail packing lines.

packed by hand, after being frozen, into cases which are wired by a semi-automatic wiring machine; after being wired, the cases are put back in the cold store.

For despatch, the fish is loaded into refrigerated rail containers, an average daily consignment being six containers or 20 tons.

Fish sticks

Since last October, the manufacture of fish sticks has been carried out by special equipment installed for the purpose. Fish sticks are made from frozen blocks, weighing 17 lb. 4 oz. apiece, which are sawn into strips by a cutting machine. The strips are guillotined, covered with batter and crumbs, and placed on trays which are then loaded into metal cages. The cases pass into an automatic frying machine, where the fish sticks are cooked. After being removed from the fryer and cooled, the fish sticks are packed into boxes and frozen.

Cabinet packs of 1 oz. fingers are packed six and ten to a box; the larger size are packed in boxes of 3 dozen.

Quality control

The quality control department, which is in the charge of a qualified bacteriologist, comprises a bacteriological laboratory, a chemical laboratory, and a kitchen. Routine tests are carried out daily on quality, salt and smoke content, and tasting assessments of all fish products. In addition, bacteriological checks are made on equipment as well as products. Besides the routine samples, the two quality controllers are empowered to take random samples at any time from any part of the factory.

In the kitchen, checks on method of packing, appearance and conformity with specifications of the pack laid down by the management are made. A cooking test and flavour assessment are then carried out. The standard practice is to take a sample from the production lines every 15 minutes.

In the bacteriological laboratory, fat contents are determined as well as tests for bacterial contamination. We saw in this laboratory a machine for preparing experimental vacuum packs made by Laroche of Paris.

Beside the routine tests, experimental work is continually in progress to find new and better technique for assessing quality and for improving the keeping quality of fish.

* * *

Mac Fisheries' Fraserburgh factory typifies the new attitude and techniques which must permeate the industry if it is to be revitalised. This does not involve the wholesale throwing overboard of traditional methods, but rather transforming them in the light of modern knowledge and technology. Old methods, such as smoking, although developed over the centuries by empirical methods of trial and error, have nevertheless sound scientific foundations; when the scientific principles behind

(*Concluded on page 121*)

Part of the quality control laboratory.

FOOD MANUFACTURE
ANNUAL REVIEW

Dairy Products

By W. G. Wearmouth,* Ph.D., B.Sc., A.R.I.C.

Liquid milk ★ frozen milk ★ flavoured milk drinks ★ cream ★ butter ★ cheese ★ new cheese products ★ ice cream ★ dried milk ★ whey utilisation ★ casein

Liquid milk

VERY little work appears to have been done on liquid milk during the twelve months under review.

Further research on in-bottle pasteurisation[1] has been carried out in France, where it was found that pasteurisation at 63·5°C. for 30 minutes gave excellent results with no deposit left on the bottle, although the cream line was thick. Heating the milk at 70°C. for 25 minutes gave satisfactory bacteriological results and there was no skin formation. It should be pointed out, however, that under the conditions of study, high temperature pasteurisation was not found to be practical, because of the difficulty of preheating and because of deposits left on the bottle.

A study of pasteurisation, burning on of milk and cream plug formation has been made in Sweden.[2] It has been established that the higher the pasteurisation temperature, the greater is the tendency of the milk to burn on and form milk scale. Greater differences in temperature (*e.g.* 10°C.) are permissible between the heating surface and the milk when lower pasteurisation temperatures are used (*e.g.* 70°C.). A greater temperature gap was possible at low pasteurising temperatures when the velocity of the flow of the milk was increased. This, however, had little effect at 90°C. The milk had an increased tendency to burn on when its acidity or air content was increased.

It was found also, that cream plugging was promoted by the following factors:

(1) agitation (*e.g.* pumping) especially at temperatures near the melting point of the fat.

(2) high pasteurising temperatures.

(3) an undue air content in the milk.

(4) storage of the milk at 5°C. for 24 hours followed by storage at 17°C. for 24 hours. A combination of two or more of these factors aggravated the defect.

A dairy in the Netherlands is making coloured polythene bags available to its customers to fit over milk bottles and protect them from the adverse effects of light.[3]

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Frozen milk

An American dairy in Bay City, Michigan,[4] has always used bottles for its own milk and bought cartoned milk from another dairy. Recently, however, mainly due to demands they have begun to supply frozen milk. The milk is packaged conventionally in plastic-lined paper containers, then frozen (at temperatures below zero) in the ice cream hardening room within twenty-four hours in lots of 1,000. The product is then delivered to freezer owner customers in an insulated truck, at fortnightly or monthly intervals. The customers store the milk in freezers (mostly 26 cu. ft. capacity), and to defrost they leave the milk overnight at room temperature. The following morning the milk is still ice cold and from then on, the customer handles it as ordinary fresh milk.

The frozen milk does separate slightly after thawing, but it is ready to be poured after a few shakes of the container. One great advantage is that frozen milk is never allowed to stand out in the sun to warm up as sometimes happens to home delivered milk. A further advantage is that delivery costs have been cut, and therefore the frozen milk is offered at a discount price. The dairy have found their frozen milk so successful that they are now freezing and distributing skim milk and multi-vitamin milk.

Flavoured milk drinks

The trend towards flavoured milk drinks has resulted in a number of new processes for improving the flavours of these drinks.

In order to prevent sedimentation, it has been found that when Irish moss extract stabiliser is added to the milk, which is then pasteurised and cooled in the usual manner, flavouring ingredients such as cocoa, a sweetened chocolate syrup, other flavoured syrups or crushed fruit flavourings can be added.[5] Although the flavouring ingredients are in the form of small particles, they remain suspended and stabil-

ised in the drink. Two other American workers have discovered that the tendency of chocolate flavoured milk drinks, produced by a cold process, to form serum-like layers, can be eliminated by adding a particular Irish moss extract.[6]

Another American patent[7] describes a process of producing an acid fruit juice milk drink. This process consists of dissolving a colloid (gelatin) in hot milk, and the mixture is then cooled to about 70°F. Citrus fruit juice is then mixed into the cooled product, the resultant mixture being gelled under refrigeration. Liquid milk is mixed into the gelled product to provide a beverage of desired consistency.

The method reported above appears to do away entirely with the normal action of the pectin in citrus fruit juice, when it is added to milk.

Cream

Workers in Sweden claim that the viscosity of cream, containing 12-14% fat, is improved by increasing the homogenisation temperature to between 40° and 53°C.[8] They also state that the stability of the cream, measured by the tendency of the fat to remain constant on standing and the behaviour of the cream in hot coffee, is also improved by these higher temperatures. Lower homogenisation temperatures have adverse effects which are not overcome by increasing the homogenisation pressure above 300 kg. per sq. cm. The adherence of 19-84% of the proteins to the fat is caused by homogenisation at the higher temperatures, but it was found that the effects of homogenisation cannot be foreseen from the initial viscosity of the cream. For cream to be soured, pressures of 100-200 kg. per sq. cm. and the higher temperature are recommended.

Another group of Swedish workers[9] claim that high temperature pasteurised cream can be stored in bottles at 0-2°C. for seven days without deterioration. In this case, deterioration is judged by taste, odour, the reductase test and bacteriological examination. It has been noted that storage of this cream cannot be prolonged to a period of twenty-eight days without the development of noticeable defects. However, if special attention is payed to cleanliness and laboratory control, storage can be prolonged to fourteen days.

Butter

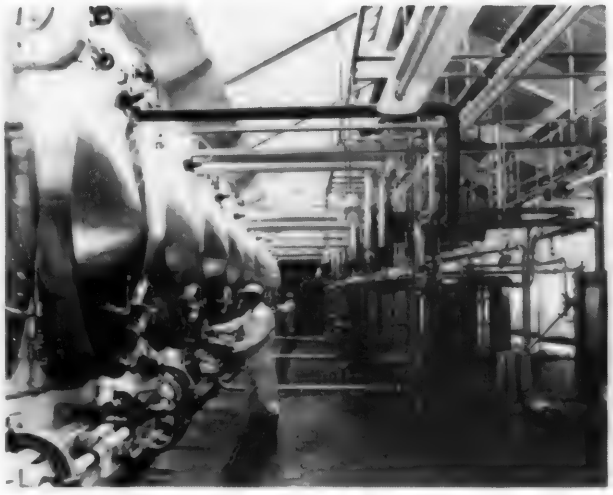
A Russian worker has been examining the difference in keeping quality between continuously and batch produced butter.[10] Fifty-six consignments of continuously produced butter were stored at −6°C., −7°C., and −16°C. during twelve months. Twenty-eight consignments of batch produced butter were stored under the same conditions. The butter was examined bacteriologically both before and after storage, and organoleptic and chemical tests were carried out every three months. Organoleptic quality deteriorated progressively with time, but this was more noticeable in the batch produced butter. The incidence of bitter, oily, sour and fishy flavours was higher in the batch produced butter, but the tallowy and unclean flavours were lower. The increase of serum acidity is twice as high in batch produced butter, but there is no significant difference between the two in the increase of fat acidity. The consistency of the butter is not significantly affected by storage. The batch produced butter had a higher bacterial contamination.

This work shows clearly that continuously produced butter has a better storage life than batch produced.

In Australia the effect of temperature on the keeping quality of butter in cold storage, has been studied.[11] One thousand one hundred and eighty-two boxes of choicest grade salted butter from Victoria were split into three lots and stored at −10°, 0°, or 12°F. in Melbourne. Eight hundred and twelve boxes of choicest grade salted butter from Queensland were split and stored in Brisbane at 0° and 12°F. It was found that the storage temperature had no significant influence on the grade of butter after three or six months' storage. The score grade loss after six months was greater in the Victorian than in the Queensland butter. There was some indication that storage below 12°F. may encourage cracking or fracture of the butter, especially if it is handled in the frozen state.

A group of Polish workers[12] have been investigating the use of chemical "starters" in butter manufacture, instead of the usual biological ripenings. Chemical "starters" containing 30-50% lactic acid and 0·10-0·21% diacetyl were used, being incorporated either during the washing of the butter granules or during working. The resultant butter was stored at −19°C. for nine months, thawed, and kept subsequently at +16° to 17°C. for seven days. Examination for moisture distribution by chemical and organoleptic tests, were made during this time. When compared with control (ripened cream) butter, it was found that the experimental (sweet cream+chemical "starters") butter was of equal overall quality and kept better when stored. This difference was particularly noticeable during storage at positive temperatures after thawing. The quality of the experimental butter was not significantly affected by the method of adding the "starter" or the type of chemical "starter" used.

More work has been done to control the moisture content of butter made by a continuous process.[13] With the Czech continuous buttermaking machine, increasing the moisture content of the butter by reducing the throughput is not always practicable. This specification deals with a moisture control involving a sudden cooling of the butter granules at the exit from the last churning element. This is done by extending the churning cylinder and providing a two-section jacket for chilled water and brine cooling respectively. The butter granules tend to agglomerate at the outlet temperature (14-16°C.), the buttermilk separates easily and the resultant butter has a moisture content of about 14%. The cooling reduces the agglomeration, thereby increasing the fat-water interface and impairing the separation of the



(*Left*): The pasteurising floor at the South Morden bottling dairy of Express Dairy Co. (London), Ltd. On the left are the 14 3,000 gal. stainless steel milk storage tanks, and on the right are the pasteurisers, both supplied by glass pipelines. (*Right*): Stainless steel insulated storage tanks, each with a capacity of 3,000 gals. and fitted with electronic high and low level warning devices, at the Wakefield dairy of Express Dairy Co. (Northern), Ltd. This dairy was opened last March and is thought to be the most modern in the world.

buttermilk. In this way the moisture content increases to 16-18%.

A recent French patent[14] describes a device for spreading butter or similar substances on bread. Incorporated into the device is a plunger for the extrusion of the butter. The width of the device must be equal to or greater than the width of the slice of bread. The plunger is pressed with the index finger or by means of a rack and pinion arrangement.

Cheese

During the twelve months under review the mechanisation of cheese making has been studied by a number of people.

One American worker has produced a method for the continuous mechanical process for draining and hooping Blue cheese curd.[15] By this process, a mixture of curd and whey is pumped from the cheese vats in to a rotating disc and from there into an inclined vibrating chute, where it is dusted with dry mould immediately before falling into the hoops. Four cheeses were selected at random from all those made from a 300 gallon vat, and the moisture content ranged from 44·47% to 45·25%. The fat content ranged from 30 to 30·5%. After three weeks' ripening, the mould scores in the machine hooped cheese were higher, and the veining better than in the manually hooped cheese.

Another American worker claims that he saves a cent per pound of cheese by his method of mechanisation,[16] when it was practised in an American cheese factory for over a year. By this process, the curd and whey are separated in a rotating, perforated stainless steel drum, then the curd is transferred to a rectangular steel bin lined with draining screens. Here, pressure is applied for $1\frac{1}{2}$ to 2 hours, then the block of curd is cut into strips, which are fed into a curd mill. Brine is sprayed on to the milled curd in the screw conveyor which delivers it to the hoops. An average period of 3 hours 51 minutes is required from the setting of the milk to the end of pressing.[17] The cheese produced has been of a uniformly good or excellent quality. The authors estimate that three complete units of the type described, could, with two shifts of workers, convert 250,000 lb. of milk daily, into Cheddar cheese. An average yield of 9·2 lb. of cheese per 100 lb. of milk is obtained under practical manufacturing conditions.

The prevention of mould growth on cheese surfaces has always been a problem of the cheese industry. A group of Russian workers now recommend irradiation with ultra-violet light for one-hour periods on fifteen occasions during three months.[18] They claim that this treatment prevented the development of mould growth on the cheese, whereas the control cheese were covered with mould on the tenth day of storage. The cheeses were stored at 18-23°C. under high humidity conditions.

From Holland, promising results are reported in the control of surface mould growth on Gouda cheese, with a new fungicide, primaricine.[19] This is obtained from a culture of *Streptomyces natalensis*. Unsalted cheese was dipped for fifteen minutes in water containing 0·01-0·04% primaricine and during subsequent storage the mould growth was controlled to a considerable extent.

At the International Dairy Congress in 1959 it was reported from the Milk Centre in Stockholm that unless Swedish cheeses coated with a plastic solution at an early age are also waxed in the ordinary way, they lose excessive amounts of moisture in the dry atmosphere of the ripening room.[20] From an economical point of view, this is also an advantage, because cheese so treated require less frequent waxing and other handling and there is less loss in weight than in the cheese coated with wax only.

New cheese products

A new type of lactic cheese has been produced in Bulgaria.[21] The milk is Holder pasteurised, soured at 35-38°C. and salted in brine. It is then ripened for four months at 12-16°C. The mature cheese has 63% solids, 25% fat, 24% protein and 5·5% salt.

A rapidly ripening Carpathian cheese has been described by workers in the Ukraine.[22] The milk is pasteurised and soured by a starter of *Str. thermophilus* and *L. lelveticus*. It is renneted at 30° to 31°C., scalded at 48° to 49°C. and the curd is pressed at 5-20 kg. for 12 to 15 hours. Salting is carried out with a brine solution (22-24% salt) for four days at 12-14°C. The ripening is accomplished in 60 to 70 days at 12-14°C. The cheese weighs 45-50 kg. and possesses a typical flavour, regular eyes and a fine elastic consistency. On average, it contains 40% moisture and 51% fat in the dry matter.

Holland has produced a new cheese variety, combining some of the characteristics of a Gouda and a Limburg.[23] It is made by taking a Gouda cheese with a well-formed rind and keeping it in a ripening room at a R.H. of almost 100%. By rubbing it with a damp towel or wet hands and turning it daily a surface growth similar to that on a Limburg is obtained. After two months the rind is washed clean and the cheese transferred to normal Gouda ripening rooms where the rind dries up again rapidly; the cheese is claimed to have some of the flavour of the Limburg, while retaining the body of the Gouda, and the method is suitable for commercial manufacture.

A recent American patent[26] describes a process for producing a quick ripening cheese of high moisture content, which is particularly suitable for use in cheese spreads. This is achieved by removing 75% of the whey from the vat after cooking the curd, and replacing it with sufficient aqueous brine at a 2 to 4% concentration, to allow lactic acid bacteria to grow until the *p*H has dropped to about 5·3 to 5·7. At this stage, sufficient salt is then added to the mixture to bring the brine concentration up to 4 to 6%. The curd is then heated in the brine to about 110 to 130°F., separated from the brine, and finally cured.

"Dariwald," claimed to be a brand new cheese, has been developed in Wisconsin.[25] This is a creamy cheese, with a mild flavour, smooth texture and a high moisture content. It ripens in 10 to 14 days and is said to maintain its flavour over long periods.

A soft surface ripened cheese, of flat cylindrical shape, called Kernhem cheese, has been made in Holland.[26] It is claimed that it is a new variety of the Meshanger type of cheese. In making, milk, with a butter fat of 4·5% is pasteurised at 74°C. for 10 seconds. Then 10 ml. of rennet is added per 100 l. of milk. After about twenty minutes when a soft congulem has been formed, it is cut carefully during twenty minutes, half the whey is run off, and water is added to maintain the temperature at about 31°C. The curd is carefully stirred for about an hour, the remaining whey run off, and the curd transferred into Edam cheese moulds and lightly pressed for 90 minutes. It is then placed on cheese cloths and left for 24 hours at 20°C., during which time it spreads into the characteristic flat cylindrical shape, metal rings preventing it from spreading too much. Salt is rubbed into the surface and the cheeses are transferred to the ripening room, where a temperature of 15°C. and a high relative humidity are maintained. During the ripening period of about four weeks, the cheese surface is kept moist by sprinkling with water, which encourages the development of the characteristic surface flora of corynebacteria.

Ice cream

Three patents were taken out in the United States in 1958 for new ice cream stabilisers.

One of these new patents[27] describes how unhydrolised, water soluble, N.R.R.L. dextran can be obtained by various microbiological methods. When this dextran is added to the ice cream mix, at a rate of 0·01 to 0·5% by weight, it is claimed that it stabilises the ice cream satisfactorily.

Another new ice cream stabiliser[28] consists of a carboxymethyl ether of a native unhydrolised soluble dextran. This is incorporated into ice cream at a rate of 0·01 to 0·5% by weight. It is claimed that no dispersing agents are required when adding this stabiliser to ice cream.

From Illinois, an improved ice cream stabiliser is described,[29] consisting of a mixture of sodium hexametaphosphate, guar seed or locust bean gum, and sodium citrate or other basic salt.

A special ice cream for diabetics is now available in America.[30] It is based on condensed milk, D—sorbitol, cream, stabiliser and calcium cyclamate. The total caloric content of the resultant ice cream is only slightly less than that of ordinary ice cream.

J. Lyons and Co., Ltd., have patented a process for preparing rectangular, open ended blocks of ice cream in cardboard wrapping.[31] This can be subsequently cut into individual sandwich portions and inserted between wafers. Each portion is provided with a cardboard tab, facilitating the removal of the cardboard covering.

Dried milk

In Germany it is claimed that a very high quality dried milk product has been produced for the consumer.[32] The method of producing this dried milk is by the "no heat" BIRS drying process, which employs temperatures of 0° to 30°C. under conditions of reduced vapour pressure. This results in dried milks and various other dried food products in the form of fine, readily dispersible powders of low moisture content and high quality. On reconstitution with water, these powders reproduce, apparently unchanged, the aroma and the vitamin and enzyme status of the original material. The bacteriological condition is also reproduced, therefore very hygienic handling or pasteurisation of the material is required before drying. This process is particularly successful in drying heat sensitive material of low *p*H such as fruit juice, milk drinks, yoghurt, etc.

A fairly recent American patent describes an in-

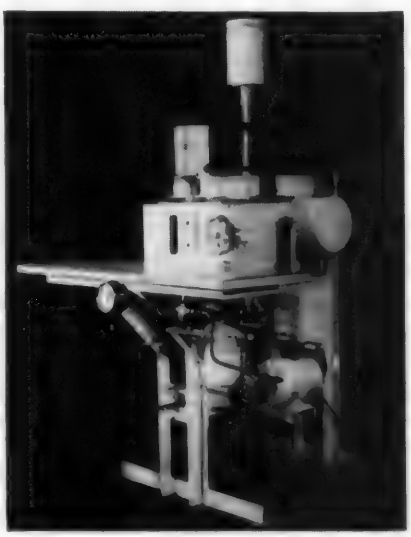
stantly soluble milk powder and the process for its manufacture.[33] This process comprises a stream of dried milk particles, containing less than 4% moisture, being exposed to steam. This causes surface moistening and agglomeration of the dried milk particles, and an increase in the moisture content, to about 9%. The agglomerates are then brought immediately into contact with a hot air stream passing adjacent to the area in which the particles are moistened. As a result, instantly soluble agglomerates are then formed. Most of the work done has been on dried skim milk, but it is claimed that the process can also be used for improving the solubility of dried whole milk, chocolate or cocoa milk and other foods containing mainly milk solids.

Twenty-five parts of dried skim milk per 100 parts of flour were used by American workers to produce a high milk protein bread.[34] This gave a loaf of generally good quality, although symmetry and crust colour were sub-standard. The protein content of the bread was increased from 13·96 to 18·04% of the dry matter. The biological value of the protein was nearly doubled as compared with bread containing only four parts of dried skim milk per 100 parts of flour. Consumer acceptability in preliminary trials has been good.

A French preparation of a new sour milk product has been described recently.[35] This process consists of adding about 3% of dried milk to pasteurised skim milk and the mixture is then repasteurised at 90°C. for thirty minutes and cooled at 45°C. It is then inoculated with a yoghurt culture (*L. bulgaricus* and *Str. thermophilus*), which also contains a pure culture of *L. acidophilus*. The product is filled into containers and incubated at 35° to 42°C. to encourage particularly the growth of *L. acidophilus*. The product, named *Yadou*, may be mixed with various flavourings and sweetened with sugar or honey.

Whey utilisation

In last year's review a number of methods of utilising whey were mentioned, and development along these lines is still being made. Two entirely new methods have, however, been recently published, one from Russia and one from Australia.



A cheese press designed by J. W. Flower and Co. in collaboration with the National Institute for Research in Dairying.

Cream storage tanks and the latest type Silkeberg "top" butter churn at the Claymore Creamery, Kirkwall, Orkney.

In Russia a new beverage has been made[36] from a mixture of equal volumes of whey and buttermilk. To this mixture is added a 25% culture of koumiss yeasts, *L. bulgaricus* and *L. acidophilus*. The beverage closely resembles koumiss and has a refreshing sour-alcoholic taste. The stability and consistency of the beverage are improved when gelatine is added.

Dried, sweet whey may now be used as a browning agent, tenderiser and flavour improver in prepared frozen foods.[37] In this capacity it is used as a browning agent for bakery goods, as a tenderiser for pie crusts and other such similar products and as a flavour carrier and extender. The values recommended are 3 to 6% for pie crusts, 4 to 15% for batter for fish, 6 to 10% for batter for prawns and 4 to 8% for batter for poultry.

Casein

A new method of utilising casein has been devised in Hungary.[38] It is claimed that a meat-like product can be obtained by mixing acid casein with about 20% by weight of "cereal groats" and adding meat flavouring compounds. The *p*H is then adjusted to 4·9 to 5·2 by the addition of any of a number of agents, and the water content is adjusted to 55 to 60%. It is then autoclaved at 90°C. for 20 to 70 minutes, and it is claimed that the product resembles meat in its cooking properties, as it can be boiled, roasted or fried.

REFERENCES

1. F. Berthault. Trav. Ecole Lait. Nancy Nr. 1957.
2. K. E. Thome. *Svenska Mejeritidn*, 1958, **50.**
3. *Missets Zuivel*, 1959, **15**, 14.
4. E. Thom. *Milk Dlr.*, 1958, **1**, 48.
5. L. S. Stoltoff. U.S. Pat. 2,834,679 (1958).
6. L. H. Berndt and R. A. Klein. U.S. Pat. 2,830,903 (1958).
7. J. E. Hughes. U.S. Pat. 2,853,386 (1958).
8. O. Aule and T. Storgards. *Svenska Mejeritidn*, 1958, **36**, 50.
9. E. Bertelsen and B. Ljunggren. *Svenska Mejeritidn*, 1958, **37**, **38**, 50.

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FOOD MANUFACTURE
ANNUAL REVIEW

Brewing

By J. Hoggan,* Ph.D., B.Sc., A.R.I.C.

Barley and malt ★ new malting techniques ★ hops ★ continuous mashing ★ continuous fermentation ★ finings ★ non-biological haze-formation ★ microbiology ★ the future

Skimming yeast before sending Guinness to the vathouse.

NINETEEN fifty-nine has been a year of many interesting developments in the brewing world. In April the Chancellor of the Exchequer imparted to it some much needed encouragement and the resultant optimism for increased sales was more than fulfilled. The most unusually pleasant summer months played no small part in the rise in beer consumption, but it is still to be seen what effects these climatic conditions have had on the qualities of the barley and hop crops.

Scientifically further interesting developments were brought to the fore, some of these being the subject of discussion at the European Brewery Convention in Rome. The Congress was attended by some 1,200 people from 29 countries, the largest contingent coming from the United Kingdom. The choice of Rome met with unanimous approval although most delegates have complained that they were kept too busy to see sufficient of this beautiful city. There is the feeling that too much was attempted in the short time available. However, the Congress Hall was admirably suited for such an occasion, being wired for simultaneous translation into English, French, German and Italian of everything that was said. Nor did the social side of the Congress fail to reach the high standard people have come to expect. For example, there were visits to the Alban Hills to see the magnificent remnants of Hadrians Villa and the gardens of Villa d'Este.

Barley and malt

Some aspects of traditional belief have been upset in a recent report by the Rothamstead Experimental Station. For instance, it has always been believed that soil needs a certain supply of "natural" manures if it is to remain in good heart, but, with the exception of some light soils, there is little evidence to support this. It has been found that composted straw has affected crop yield mainly by supplying potassium and withdrawing nitrogen from circulation while barley yield has been decreased by ploughing in straw, unless a small compensatory dressing with nitrogen is given. Other experiments have shown that heavy dressings of ammonium sulphate can be combine-drilled with the seed without affecting germination and that this method of applying the fertiliser gives better results than broadcasting at sowing time.

Much research has been carried out dealing with the different sources of malting loss (rootlet development and sugar consumption) which accompanies the derived modification of the grain. The required degree of modification, it is now known, can be achieved by less than the normal level of enzymic activity and one way in which this can be achieved is by employing potassium bromate. This chemical is very cheap and acts by decreasing the respiration of the grain during malting. A decrease in the malting loss of 1½-2% is claimed without disadvantage.

Another such substance employed to advantage is gibberellic acid which has been found to stimulate modification of malt without an accompanying stimulation of growth and respiration. In this manner extracts as high as 108 lb. per quarter of malt have been obtained but the substance is still very expensive. The malting loss, as in the instance of bromate, is decreased by approximately 2% with the added advantage that it was found possible to reduce the germination period by 2-3 days. It would appear also that the all-important enzymic systems are greatly stimulated by such treatment. This results in α-amylase and "cellulase" attaining levels of activity not obtainable with a very long germination time. Since α-amylase is not particularly sensitive to temperature it is possible to reckon with the fact

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that in this way even normally kilned malts can be produced with a very high activity of this enzyme which is so important for saccharification and dextrinisation in the mash tun. That greater conversion has taken place in the mash tun is indicated by the lower viscosities of malt extracts obtained from treated grain. Also, it may be of interest to note that gibberellic acid has no influence upon the course of fermentation and there are no harmful physiological effects upon human beings.

New malting techniques

A revolutionary malting technique has been evolved on the Continent. It is a carbohydrate treatment of barley and involves a sugar application during malting. This is a solution of 3·6 g. of glucose syrup per 100 g. of barley. The solution is added 16 hr. before the finish of the germination period. The process has been patented and is known as *Belmalt*. The effect of such a treatment appears to be an increased solubilisation of nitrogenous constituents, an increased modification and an increase in extract of up to 2·4%. It is claimed that beers brewed from such malts also show less sensitivity to chill haze, improved head retention and superior palate. However, it does not appear to be a sound economic proposition.

At the Brewing Industry Research Foundation a novel malting technique has been developed, commercial scale trials of which having proved highly successful. This involves steeping barley to 35-40% moisture content, growth for 3 days and re-steeping for 24 hr. at 62°F. In this way the rootlets perish without impairing modification. A moisture content of 52% is thus obtained, a figure which is regarded as excessive and so the grain is re-dried to 48% moisture and grown for a further 2-3 days after which it is kilned. Such a procedure has given a malting loss not in excess of 4% which is a 50% reduction on the loss normally incurred. The fact that the rootlets failed to grow after re-steeping was attributed to the imposition of anærobic conditions. However, it must be emphasised that the rate of reduction of the moisture content after re-steeping has been found to be very critical and it is felt that the process is capable of further development.

It may be timely to offer some criticism of the researches designed to investigate the behaviour of peeled corns during malting. It is realised that the husks of malt contribute haze-forming substances to beer but from the practical point of view they do provide a natural filter-aid in the mash tun. At the present time there has been no suggestion as to how the difficulties which must arise from the absence of husks could be overcome.

Hops

In recent years a great amount of research time has been devoted to hop utilisation but it would appear that brewers have been very slow to put the results of these researches to the test. The reason may be that, to obtain an estimate of hop utilisation with respect to bitterness, one must be in a position to measure the α-acid content of the hops just before use and the iso-compounds concentration in the resultant beer. It is then possible to measure accurately the effect of changes in the process upon the efficiency of hop utilisation. So far, laboratory methods of investigation have been either too laborious and time-consuming or the necessary equipment to determine these constituents has been too expensive for the average brewery. However, the conductimetric method appears to be the simplest, quickest, and least expensive yet developed. This method has recently been described by Belgian workers and they claim great accuracy.

The way would appear to be open now for a widespread investigation by brewers into the many factors which affect utilisation of hops. In the first place there seems to be just cause for investigating hop rates because it has been shown that the percentage utilisation falls as the hop rate is raised. In other words, to double the hop rate does not increase the concentration of bitter substances in beer by 100%, but only by about 50%. On the other hand, a reduction of 10% in the normal hop rate may reduce the iso-compounds in beer from, for example, 30 p.p.m. to 28·5 p.p.m., a reduction which is unlikely to be noticed by tasting trials. It would, therefore, be wise in view of these facts, to re-examine the wisdom of using a high hop rate in order to obtain a more bitter beer because it does seem as if a lot of needless expense is being created.

Hop bittering substances (iso-compounds) are precipitated by nitrogenous constituents during wort boiling and it has been found that the efficiency of utilisation decreases as the gravity or strength of the wort increases. By combining a high hop rate with a high gravity wort one would obtain an extremely low utilisation. There are three ways in which this can possibly be overcome. Firstly, the regulation of mashing temperatures to give greater degradation of protein will favour increased efficiency, and secondly, the major part of the hops may be added to the weaker or lower gravity wort. Another way in which efficiency of utilisation may be achieved is by means of a higher wort *p*H (lower acidity) but the advantages derived in respect of hop utilisation are offset by a resultant higher *p*H value of the beer. This would favour a lower biological stability.

Utilisation is affected to some large extent by mechanical details such as the compactness of the hops, the surface tension of the wort and the vigour of the copper boil. It is often found that the latter is the most important factor. Variations in the precipitation ("break") brought about by boiling can lead to surprisingly large variations in utilisation. It would appear highly necessary to have a strictly standardised boiling procedure.

During fermentation, yeast cells absorb bittering substances to an extent which depends upon their degree of flocculence and the rate at which they multiply. For instance, if the pitching yeast contains a predominant strain of yeast which does not come out

of suspension quickly the loss of bittering substances will be great. However, care is necessary in comparing the bitterness of beers by tasting trials because it has been found also that the bitterness imparted to a beer is dependent upon its *p*H. As the *p*H increases a harsher flavour is noticed.

Allied to these studies on utilisation there have been several attempts to preserve and mature hops successfully. The brewer must store hops for a large part of the year and during this time it has been found that there is a gradual loss of bittering principles. In the Weiner method hops are highly compressed and submitted for several minutes to an almost complete vacuum in a special vessel. The vessel is then allowed to return to normal pressure and then the operation is repeated several times. For long storage, carbon dioxide is introduced under pressure after the last evacuation. In this manner the hops are impregnated with carbon dioxide and they can be removed from the vessel without further precautions. It is found that the most important factor in hop storage is low temperature, but by employing this method, the undesirable effects of high temperature can be reduced by half. There is the claim that hops treated in this way exhibit a refined aroma and possess a higher humulone content which results in the production of more bitter beers.

Continuous mashing

The B.I.R.F. have developed a continuous mashing device which is a decided improvement over their first apparatus. This vessel is circular, 18 in. in diameter, and is divided into ten segments by radial vanes which rotate around a central spindle; the first compartment is charged from a Steele's type masher and after this has been filled the supply of grist and liquor is interrupted until the second empty compartment comes under the delivery arm, thus giving a semi-continuous feed to successive compartments. The mash eventually travels over a slotted portion of the base-plate and first runnings emerging from the slots are re-circulated to achieve greater clarity. Later runnings are collected from four separate underbacks and sparging can be applied as desired with worts of different gravities, either collected separately or bulked. Finally, spent grains are rejected at the last compartment through an empty space in the base-plate.

With this small-scale plant, standing time, temperature and sparging conditions can be altered at will. Wort at the rate of 100 barrels per week can be obtained from a mash tun of the above diameter, whilst with a 15 ft. rotary mash tun it might be possible to achieve a production of 10,000 barrels of wort per week in continuous operation.

It is claimed that the analytical characteristics of the worts produced in this manner are comparable with those produced by conventional means.

Continuous fermentation

Once more the Research Foundation have been investigating this field. Recently they have published work concerning the influence of different factors on the process as a whole.

Generally, it has been found that all strains of yeast studied have produced palatable beers, free from yeast-bite, both over a range of temperatures up to 30°C. and over a range of gravities (1·030-1·102°). On employing mixtures of yeast strains it was found that there were two broad divisions (a) those in which one of the strains became dominant within 2-3 days and (b) those in which the original composition was maintained (both classes are encountered in conventional top fermentation systems) but the efficiency of the mixture was usually less than the average value of its individual components. It may be assumed that this is a point in favour of employing a single strain pure culture of yeast.

The number of vessels employed in the system appears to be a critical factor as far as the particular yeast strain employed is concerned, and it has been found that there are two patterns of behaviour (a) those yeasts whose efficiency appears to be relatively independent of the number of vessels employed and (b) those whose efficiency is decreased when the entire fermentation is conducted in a single vessel. With regard to the latter group, it has been shown that these yeasts are inhibited by even moderate concentrations of alcohol and this may explain the relatively poor efficiency of such strains. In a multi-vessel system the concentration of alcohol in the final vessel is obviously of less importance.

Contrary to conventional batch fermentation in which it is necessary to have a good yeast head to enable a continuation of the pitching yeast, in continuous fermentation the efficiency of the process is decreased as the tendency for head formation increases. Mechanically, there is the disadvantage that aggregation may block the interconnecting pipes of the vessels in a multi-system. For a similar reason, flocculent yeasts are also a mechanical hazard.

To those not familiar with this process it would seem that a high standard of cleanliness must be maintained. However, it is said that a sterile medium can be maintained without employing any special cleaning procedure. The risk of contamination must not be taken so lightly because it has been found that there was a fall in efficiency of some 20-30% following an infection by *Acetobacter*. On the plant scale it will be difficult to eliminate such organisms completely.

New Zealand Breweries have recently begun production of beer by the continuous fermentation process. The officials of the company claim that the system at their Standard Brewery is so designed that throughput can be varied at will, thus overcoming the objection that this process is not flexible.

The system takes the form of two identical interconnected vessels, beer emerging from the second vessel. The beer then goes into a special yeast-separating vessel, in which all surplus yeast is removed, and the beer is then sent to cold store for final processing which includes storing for one week followed by filtration and carbonation.

(*Left*): **Supervising the boiling of wort with hops.** (*Right*): **A malt hopper feeding into a malt mill. The attendant is supervising the malting process.** (*All photographs are by courtesy of Arthur Guinness, Son and Co., Ltd.*)

The whole of the procedure at this brewery is based upon the wort storage procedure, the wort being stored for approximately 48 hr. prior to filtration and excise calculations, after which it is fed direct into the fermenting system. After filtration through the hop bed in the hop back, therefore, the wort is chilled to 32°F. or slightly below and is then passed into one of three cold rooms and stored in glass-lined tanks. After a 48 hr. holding period the wort is passed through kieselguhr filters and collected in other cold tanks for excise calculations. The wort then begins to flow, via a flow meter, into the continuous fermenters.

Finings

Finings have received very little attention in the past if the dearth of literature on the subject is a guide. It is, therefore, most refreshing to read the advisory leaflet on finings published by the B.I.R.F. This publication has been well received in the industry and will clear up many misunderstandings.

Isinglass finings are now believed to react with yeast cells by virtue of an electrostatic interaction, the isinglass being positively charged and the yeast cells negatively charged. These electric charges decrease as the acidity of the beer increases, the result being increasing fining difficulties. Difficulty in fining will be encountered also where beer has a high inorganic salt content. Calcium ions have a double positive charge and are, naturally, more effective in counteracting the charge on a yeast cell than monovalent ions such as sodium. It must be remembered that the efficiency of neutralisation of the charge on the cell by ions will depend upon the yeast strain involved.

An interesting development, mainly of academic interest, has been the discovery that there is a simple correlation between the phosphorus content of yeast cell walls and the extent to which the cells are negatively charged. For example, temporary non-fining cells are obtained from yeasts which fine under normal conditions by imposing phosphorus starvation upon them. However, since beers generally have adequate quantities of phosphorus, this is unlikely to be the cause of fining difficulties in practice.

Furthermore, fining difficulties are experienced where there is a wild yeast infection. These non-brewing organisms are not strains of *Saccharomyces cerevisiæ* and they do not possess a charged cell surface, hence, it is thought, the lack of response to isinglass finings. Wild yeasts are picked up, generally, from brewing plant and casks, but not from finings themselves unless the sulphur dioxide content is less than 350 p.p.m. The growth of these yeasts, hence increasing fining difficulty, has been found to be accentuated by faulty cellar management.

It is interesting to learn that the addition of isinglass finings during wort boiling can, in some instances, improve the head retaining properties of a beer.

Non-biological haze-formation

Extensive researches have shown that Nylon 66 adsorbs potential haze-forming substances from beer. These compounds, the anthocyanogens, are thought to combine with proteins to form a haze and, therefore, if either of the substances is removed the possibility of haze-formation is reduced considerably. The nylon is employed in a finely divided form in order to achieve maximum adsorption of anthocyanogens and it can be used in powder form or as a paste (a 20% dispersion of nylon in water).

The practical application of the nylon is proving a difficult task. Work at the Research Foundation has indicated that nylon can be employed as a filter, the addition to cask not being suitable because (a) the resin is not easily utilised to its full capacity, (b) it is not easily recoverable and (c) prolonged treatment causes some loss both of isohumulones (bittering substances) and of foam stability. By using nylon in the form of a filter one achieves ready recovery whilst the treated beers do not possess any undesirable flavours as a result and they exhibit a very marked resistance to oxidation and chill hazes. Rates of filtration and nylon/beer ratios vary from beer to beer.

These filtration techniques can take the form of either a bed of nylon or nylon held between two suitable supports. There is the possibility that the nylon can be incorporated in filter sheets but recovery would not be possible and it would seem likely that the sheets would have a short life. It is preferable to filter polish-filtered beer through the nylon because there would be no interference from yeast and nylon recovery would be simple. Such a step, of course, would involve the bulking of treated beer prior to bottling, an essential step because the rate of adsorption of anthocyanogens decreases as filtration proceeds.

A drip-feed method has been devised also in which the concentration of nylon and the period of contact with beer are reduced. The nylon, in the form of a suspension, is "drip-fed" into rough-filtered beer, the nylon being filtered out immediately and the beer passes to the polishing filter. The drip-feed can be adjusted to suit the filtration rates employed normally and it has the advantage of being a continuous process.

There have been no detectable effects on palate or head retention, even after the removal of 50% anthocyanogens. However, the brewer must aim for 20-25% removal, because by using very high concentrations of nylon with a view to removing 50% of these substances or to reduce the contact period, there is a tendency for isohumulones to be removed. This would result in a less bitter beer.

In conclusion, Nylon 66 appears to offer great possibilities for the reduction of non-biological haze compounds. At the present rate of progress it seems that a solution to the problem of application will be found in the near future. The importance of such treatment lies in extending the shelf-life of bottled beer and it will be of great economic value in reducing the storage periods of beers prior to bottling.

Microbiology

It has been stated very recently that the main spoilage organisms of beer are those which do not over-oxidise acetic acid. These are regarded as varieties of *Acetobacter suboxydans* and Shimwell has suggested the name *Acetomonas*. Such organisms can grow in the presence of very little dissolved air, and voluminous slime production allows a small infection to cause a great deal of damage. In the brewing world this condition is known as "rope."

Two diastatic strains of lactic acid bacteria have been found which cause superattenuation in the presence of yeast. The bacteria hydrolyse the starch and dextrins in wort, the products of which the yeast is able to ferment. The two types take the form of rods and cocci, the former being recognised as a diastatic variety of *Lactobacillus pastorianus* (*L. diastaticus*). This strain is extraordinarily hop-tolerant (hop rate 6 lb. per barrel, original gravity of beer 1·075°), and causes acidity superattenuation and deterioration of aroma and flavour. The cocci were identified as representing a strain of *Streptococcus damnosus* (*Str. diastaticus*). It produces, with yeast, superattenuation and tolerates as much as 14% alcohol. These strains should be of particular interest to brewers.

It can be demonstrated that by employing relatively simple cleaning methods *Lactobacillus* infection can be kept under control in the brewery, but great difficulty has been found in checking *Acetobacter* infection. In the latter instance, of course, brewers will find that sterilising agents on the market are not as effective as one would desire. This is particularly serious since *Acetobacter* strains have been found to be the cause of many complaints once beer leaves a brewery, much more so than *Lactobacillus*, and it appears that *Acetobacter* are encouraged to a very extensive degree by sub-standard cellar management.

The application of antibiotics has featured prominently in research work in Europe and the United States. However, the use of antibiotics is to be avoided for several reasons, not the least of which is the fact that it can be very expensive. On a laboratory scale actidione and polymyxin are employed in methods for the selective estimation of *Lactobacillus*, *Acetobacter* and *Flavobacterium proteus* in pitching yeasts and beers. The method recently developed at the Research Foundation can produce a very useful yardstick by which to judge plant cleanliness if introduced into the work of a laboratory.

For many years now people in the industry have looked upon the employment of single strain cultures of yeast very unfavourably. It has been the belief that no one strain can impart all the desirable characteristics to a beer. Conversely, it is true to say that in a brewery pitching yeast which consists of three strains, two of these may be highly unsuitable. Over the years, however, it would appear that the possible presence of two unsatisfactory strains has been more acceptable than the use of a single strain. A recent publication by Dr. J. S. Hough (B.I.R.F.) reveals that in a survey of 39 British pitching yeasts 12 contained only a single strain and 16 had two major strains. Of course, it is not possible to obtain an estimate of how long such a situation has existed but this survey should serve to alter opinions in the brewing world about the usefulness of a single strain culture of yeast.

(Concluded on page 122)

WORLD FOOD SUPPLIES—2

Sources of Food—II

By Francis Aylward,* Ph.D., D.Sc., F.R.I.C.

Concluding the section on food sources, the author deals this month with possibilities of increasing food supplies from fish culture, from materials which in their normal state are not suitable for human food, and by eliminating waste. Next month, Dr. Aylward will consider the choice of foods.

RECENT reports and symposia have drawn attention to the importance of fish as food and to the desirability of increasing fisheries production.[9, 19, 24] The F.A.O. statistics indicate that some 80% of the total world catch of fish (with crustaceans and molluscs) are produced in the northern hemisphere; the contribution made by fish to the diet varies greatly from country to country but it is noteworthy that 40% of the world's total is produced in Asia —in south-east Asia and the Far East—where fish may be almost the only source of animal protein.

In 1953 the F.A.O. reports suggested that the yields of fish from the waters of the world could be increased by 50% without endangering stocks; other authorities believe that much larger increases are possible. Over the five year period 1953-8 an increase of 18% appears to have taken place with every prospect of this rate being continued for some time.[21, 27]

Inland fish farming can often yield more protein than the same area used for grazing. Indonesia is one of the countries co-operating with F.A.O. experts in the development of fish farming methods. The picture shows Mr. Van der Ploeg of F.A.O. examining carp harvested from a private farmer's pond near Lembang.

SEAS AND INLAND WATERS

Although much valuable information has been obtained on a local or regional basis by centres such as the Torry Research Station in Aberdeen, our knowledge of marine biology on a world basis is somewhat meagre; it is evident that so far as coastal waters are concerned precautions must be taken to avoid overfishing and that international agreements are essential. It is clear too that in many countries improved boats and equipment are required to extend the range and efficiency of fishing; there is a striking contrast between the highly organised fishing industry in the U.K. with the use of modern vessels and the primitive industry in many parts of the world.

More fish culture needed

There is need also for a wider knowledge of methods of preserving the catch both to minimise losses and to enable the catch to be transported to inland areas where the need for supplementary protein may be great.[19] In this respect the research programme at the Torry Station and similar centres has an international significance.

Inland fisheries make a substantial contribution to the food supply of many areas, and Finn[24] and many other writers believe that a considerable development is possible not only in regard to wild stocks in lake and rivers but also by fish culture in enclosed bodies of water such as ponds, reservoirs and irrigation systems. The 1956 F.A.O. statistics gave a world estimate of 3 million tons; over half came from Asia, but it has been suggested that this may be an underestimate in view of the prevalence of fish culture (on a subsistence rather than commercial basis) in China, Indonesia, Thailand and other areas in south-east Asia.

In tropical countries fish grow in inland waters more rapidly

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than in colder areas; it has been stated that the rate of growth doubles (within certain limits) for every 10°C. rise in temperature and that the natural productivity of ponds in tropical areas may reach very high figures which may be further increased by fertilisation.[10] In China and other Asian countries fish are cultivated in the flooded rice fields and the yields may be considerable and could almost certainly be increased. One American group estimated that Japan could raise in this way 500,000 tons of carp annually in contrast to the actual yield of 2,500 tons in 1950.

Investigations in the U.K. and elsewhere have shown that fish meal of good biological value and suitable for human use can be prepared as a supplementary food. Fish meal is, of course, used as an animal feedingstuff and also as a fertiliser.[19, 24]

Marine plants are used as food in Japan and other countries and active research has been going on in various centres on the utilisation of seaweeds or their products for animal or human food or as fertiliser.

Table 3. Seas, Lakes and Rivers.

Aims	Some methods
A. ANIMAL LIFE	
Wider use of fish as food through:	
1. extension of fishing in coastal waters and of deep sea fisheries;	1. Through wider knowledge of marine biology and of technological problems of fisheries.
2. establishment of fish in rivers and inland seas and reservoirs.	2. Use of vessels filled with modern equipment.
	3. Bi-national and international conventions to avoid depopulation of seas and extinction of species.
	4. Establishment of fish breeding stations and hatcheries.
B. PLANT LIFE	
1. Collection and utilisation of sea-weeds for use as fertilisers, animal foodstuffs and perhaps also for human food.	1. Research on composition and methods of harvesting and utilisation of sea plants.
2. Cultivation of sea plants.	2. Through greater knowledge of plant physiology.
3. Water culture (hydroponics.	

Table 4. New Sources of Human Food

Possibility	Example
1. New types of crops.	Success in introduction of soya to U.S.
2. Processing of plant materials:	
(*a*) to give edible materials;	Cottonseed gives edible oil and protein;
(*b*) to make better use of vegetable wastes;	Sugars by chemical treatment of cellulose and starches;
(*c*) to use chlorophyll containing material.	Proteins from grass.
3. Cultivation of marine plants.	As practised in Japan.
4. Soil-less culture (hydroponics).	As demonstrated in California.
5. Cultivation of micro-organisms and algæ.	Food yeast.
6. Processing of animal materials.	Whale oil to margarine.
7. Chemical synthesis of major and minor food components.	Synthesis of vitamins and amino-acids. Production of fats from petroleum.
8. Biochemical synthesis—fermentation methods.	Vitamins.

NEW SOURCES OF FOOD

Some of the proposals listed in table 4 have already been referred to under other headings; they are included in this table because they illustrate some special lines of research being carried out in various countries.

The successful introduction of the soya bean in the U.S.A. indicates how rapidly a crop indigenous to one area (China) can be accepted elsewhere and can make a valuable contribution, both directly and indirectly, to food supplies.[7] The soya bean as a multipurpose crop provides edible oil, edible protein, and vitamins with other minor components. Several other examples can be quoted of the adaptation of crops from one region to another; from Central and South America potatoes have come to Europe, maniac (cassava) maize and the cacao bean to Africa; citrus fruits from the East were adopted by Florida; "Turkey Red," the drought resistant winter wheat from eastern Europe, was sown with success in the American Middle West. Because of such precedents, there are reasonable grounds for believing that new species or varieties of crops may be successfully introduced in tropical and other areas.

Such crops will not, of course, provide any effective increase in the food supply if they merely displace others of similar characteristics; the objective must be (a) to find crops giving food of higher nutritive value (*e.g.* richer in protein) or in greater yields than those displaced, or (b) to introduce new crops into areas not at present cultivated. The failure of the ground-nuts scheme in Tanganyika illustrates the practical difficulties of large-scale projects, but also provides lessons of value, including the need for adequate soil surveys as an essential preliminary for new agricultural projects.[16]

Transforming normally unsuitable materials

The processing and treatment of plant materials is being actively investigated and recent successes are illustrated by the work on cottonseed, now recognised as a multi-purpose crop; whereas the residue from oil extraction has in the past been used mainly as a fertiliser, recent investigations have been directed to the isolation and practical methods for the elimination of the poisonous component (gossypol) which made the protein unsuitable as a foodstuff.[1] This illustrates a line of research which

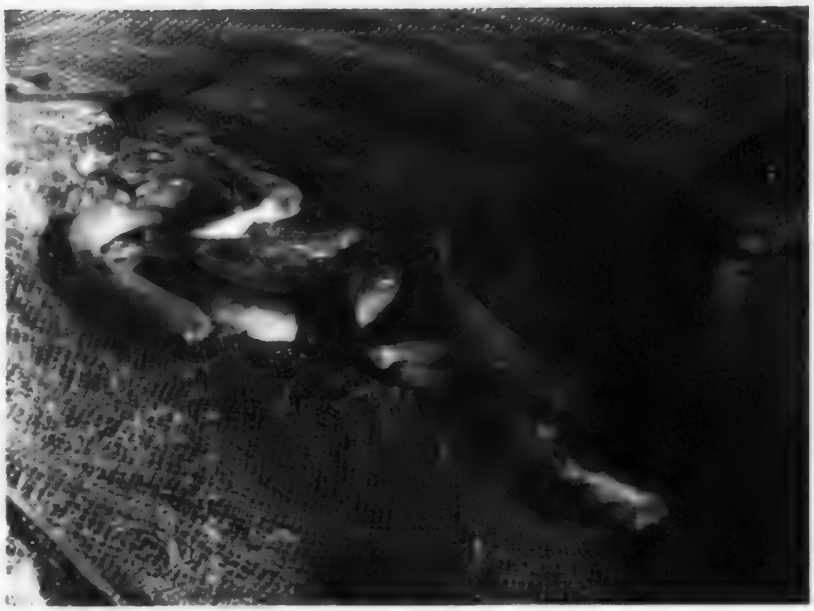
could no doubt be applied to other crops to make them more suitable for animal and human foods.

The production of edible starch syrups ("confectioners' glucose") from maize and other starch containing crops is now well known; other developments have shown how edible sugars can be obtained commercially from cellulose.

The cultivation of marine plants as practised in Japan and the production of crops by hydroponics (as demonstrated in California and during the war by the U.S. troops in the Pacific) indicate lines of possible developments of potential use in certain countries.[19]

The transformation of animal materials normally unsuitable as foods to useful ingredients is illustrated by the familiar example of the production of margarine and other fats from whale oils.

Special attention has been focussed in recent years on three items in table 4—namely the use of micro-organisms and algæ, the extraction of chlorophyll-containing material such as grass and factory syntheses of food components.



There are great possibilities for fish farming in America's rice growing areas in Arkansas, and as a result of a survey by F.A.O. specialists, the U.S. government has established a research station to investigate the problems involved, such as finding the combinations of fish with complementary feeding habits, determining the fertilisers which will encourage the growth of fresh food supplies, health measures, harvesting, processing and marketing. The Channel catfish, shown here, one of the important fresh water fish in the U.S.A., is one of the likeliest kinds to be used for fish farming.

Food yeast production

Although the food yeast production programme appears to have met with difficulties in the West Indies, pilot plant production has been developed in Puerto Rico and in several other countries. Similar programmes have been proposed for various types of fungi. With the latter (as with yeasts) the composition of the product can be varied with the strain and the conditions of culture (*e.g.* to produce high fat yields). One possible difficulty may arise in that the lipids of some micro-organisms differ considerably from typical animal and vegetable fats (*e.g.* branched chain fatty acids may be present which may be quite unsuitable for human use).

The great merit of the food yeast scheme is that it can provide good quality proteins and B vitamins at a low cost. The difficulties lie partly in producing material of bland flavour which can be readily incorporated in foods and accepted; some of the problems seem to have arisen from the premature use of the product without full experimentation, but reports of success have been published in the U.S.A., India and elsewhere.[10, 20, 30, 37, 39]

The production of uni-cellular plants such as algæ (for use either as a human food component or for livestock feeding) has been investigated in various European countries and in California.[10, 35] As with yeasts, crops high in protein or in fats can be obtained. Many technical difficulties arise in large-scale production and certain aspects of the plan have been criticised.[36]

Food from leaves

Linked with the algæ proposals have been experiments on the efficiency of photosynthesis in various types of plants and also investigations on biochemical aspects of photosynthesis.

Pirie in the U.K. and other workers elsewhere have drawn attention to the vast reservoir of chlorophyll-containing plant material that could be made available if efficient methods could be devised for processing and extraction.[37]

It is said that the land plants of the world produce the equivalent of 40 lb. of carbon in organic combination per day for each person in the world; only a small proportion of this is at present available for man.[14]

The successful treatment of material such as green leaves is partly an engineering problem (the difficulties in transition from laboratory to large-scale techniques) and partly chemical (treatment of protein so as to make it suitable for food and freeing protein from waxes and other leaf components). Claims have recently been made for a new method of processing based on disintegration by shock treatment (analogous to depth-charge techniques).[32, 40]

Food synthesis

Much interest has been aroused in the chemical synthesis of food components, and in Germany and elsewhere it has been demonstrated that fats may be produced from petroleum;[26] difficulties in applying this to human nutrition may arise because of the presence of branched chain and other "unnatural" fatty acids which cannot

be utilised in the body. The more limited plans already put into operation for the factory synthesis of various vitamins and individual amino acids may be of much greater importance.

Another important area of current research is that of large-scale biochemical syntheses. It has been well known for 50 years that yeast fermentation under controlled conditions produces instead of alcohol a variety of other substances; citric acid, for example, has been manufactured by a fermentation process for a long time and in considerable quantity.

The discovery of penicillin and its commercial production has stimulated research into industrial fermentations generally and there is now a body of knowledge and experience which was not available a few years ago.

One need not be unduly optimistic in believing that this, combined with older experience and skills in relation to brewing and alcoholic fermentations generally, can be put to good use in the future—if not for the production of food in bulk (such as the food yeast already referred to) at least for the manufacture of vitamin and other accessory factors.

AVOIDANCE OF WASTE

Very considerable losses of food occur in the field, during storage and in the kitchen as a result of virus and other diseases of crops and the action of micro-organisms and pests of many types (such as insects and rodents). In addition to the loss in crops and foods of vegetable origin, there is serious wastage because of animal diseases (including parasitic infections) and deterioration in animal foods on storage.

Many of the older as well as the newer techniques of food technology are concerned primarily with the preservation of food in order to reduce wastage. Ancient methods, such as the use of underground storage chambers, may be regarded as the historical forerunners of the modern cold storage warehouse and the domestic refrigerator or deep freeze cabinet; techniques such as sun-drying (still extensively practised) make use of the same basic principle as new methods of concentration and spray or freeze drying.

Table 5. Avoidance of Gross Waste of Food or Loss of Nutrients

Causes of Loss	Remedies
1. Losses in: (*a*) *field* through diseases of animals and crops; action of rodents and other pests; (*b*) *during storage* through pests and micro-organisms; (*c*) *in homes and restaurants*—various causes.	1. Application of pest control measures in agriculture and in ports and inland warehouses.
2. Nutritional losses in processing or cooking.	2. Application of knowledge of food technology especially: (*a*) old and new methods of food preservation; (*b*) methods for utilisation of by-products: *meat:* establishment of processing centres near site of production; *fish:* preservation and processing on board ship; *crops:* processing of portions traditionally regarded as non-edible.
3. Discarding of edible or potentially edible material from: (*a*) domestic animals, after slaughter; (*b*) fish, after catching; (*c*) crops, after harvesting.	3. Wider application of nutritional knowledge in factory, restaurant and home.
4. Discarding of edible or potentially edible products during food processings, e.g. whey from cheese production.	
5. Diversion of edible materials (e.g. fats) for non-food uses.	

Better processing means less waste

Wastage of animal products may be illustrated by the deterioration of fish and the discarding of offal. Over the past twenty years investigations have been carried out at the Torry Research Station and elsewhere to devise more effective methods for dealing with the catch at sea, for example, through the provision of "factory ships."[19, 24]

Over the same period there have been changes in slaughterhouse practice in many countries (cf. decentralisation of abattoirs from Chicago to several other areas in the U.S.) and intensive research into more complete utilisation of animal products (for example, production of edible protein from blood).

In the U.K. and elsewhere it is possible to point to losses in food processing techniques (*e.g.* whey from cheese production). The solution to such problems often awaits new discoveries, for there are great difficulties in disposing of effluents, even those of considerable potential nutritional value, and it may be uneconomical to use dehydration methods.

Waste in homes and restaurants

The wastage of food in homes and catering establishments is probably greatest in countries with the highest standards of living, but is not unknown elsewhere. In the U.K. there is evidence that the waste in the home may be least with large families and most with people living alone. McCay's report on problems of a U.S. naval mess revealed losses (arising from wastage at the table) that are probably common in institutions, as well as in restaurants and industrial canteens in many countries.[33] He showed how a reorganisation of catering service could produce speedy reforms.

Losses must be considered not only in terms of gross wastage of food but also in the loss of nutrients during storage, processing or cooking.[22, 29, 34] Some losses of unstable vitamins are almost inevitable during processing, but if the methods are properly controlled they should be no greater and perhaps even considerably less than during storage in the time interval between the field and the kitchen. Losses of a different character (*e.g.* through milling and refining techniques) may be all important in countries where the diet is already poor, and in at least one country steps would appear to have been taken to control such processes.[18] It is evident that one of the most important aspects of

the work of the nutritionist in overseas countries is the examination of old and new food processes to assess changes in nutritional value of food.

Significant losses of nutrients take place in cooking,[5] and particularly in large-scale catering; the full extent of such losses is not known because adequate surveys are rarely made or published.

The loss of food or food components from the different causes is undoubtedly high and no reliable estimates can be made of the total wastage throughout the world. It is said that in the U.S. the loss of field crops caused by insects may be 10% or higher[21] and similar high figures have been put forward for losses during storage and in catering. Such estimates suggest that the avoidance of waste may be the most rapid method available for increasing the food supplies of the world.

Important sections of chemical industry are now actively concerned with the manufacture of pest control agents, as well as with materials to combat plant and animal diseases and much has already been accomplished. This newer knowledge, together with information about food preservation methods should be of great importance in overseas countries where food shortages are most acute.

CONCLUSIONS

Russell in his presidential address to the British Association pointed to three major limiting factors in food production, (i) the utilisation of only 7 to 10% of the earth's land surface, (ii) the conversion by the animals of 10 to 25% only of its food intake to human food, and (iii) the fixation by the plant of no more than 5% of the radiant energy it receives; all these limiting factors constitute a challenge to science.[28]

In this article a summary has been given of some of the suggestions made for conserving and increasing the world's food supply; it is probably true to say that the majority of those working in agricultural science and in food technology believe that much can be achieved without waiting for new discoveries, by the application of present knowledge especially in those parts of the world where the needs are greatest and technical experience not readily available. There is undoubtedly need for further investigations both fundamental and applied, but education in agriculture and food technology is of prime importance.

In Ceylon, F.A.O. experts have surveyed fishing techniques used by local fishermen, and installed two fishing craft experimentally with engines (one of the craft is shown in this picture). The results were so successful that a large number of engines have been supplied under the Colombo Plan.

Many of the topics discussed in this article cannot be considered in isolation and they must be related to wider problems of natural resources — in particular water, fuel and power supplies generally.

It is sometimes suggested that nothing short of a series of large-scale projects ("international T.V.A.'s") will effect any permanent improvement. Although it is true that multi-purpose schemes, such as the Volta River plan in Ghana, are of great potential importance, there is abundant evidence that much can be achieved by modest means.

One report (on Afghanistan) stressed the importance of introducing simple implements such as the scythe. Another report on undeveloped countries affirmed "the problem is not one of imposing highly mechanised modern agricultural techniques on these areas. Rather it is a problem of making step by step advances from what is now a largely primitive agricultural economy.[28]

REFERENCES

This list is confined largely to publications which themselves contain detailed references to sources.

A. Monographs and textbooks

1. A. E. Bailey. "Cottonseed and Cottonseed Products," Interscience, New York, 1948.
2. J. De Castro. "Geography of Hunger," Gollancz, London, 1952.
3. R. Calder. "Men Against the Desert," George Allen and Unwin, 1958.
4. R. Calder. "Men Against the Jungle," George Allen and Unwin, 1954.
5. B. Callow. "Cooking and Nutritional Value," Oxford Clarendon Press, 1945.
6. D. Lilienthal. T.V.A., "Democracy on the March," Harper, New York, 1945.
7. K. S Markley. "Soybeans and Soybean Products," Vols. I and II, Interscience, New York, 1950.
8. H. J. Massingham and E. Hyams. "Prophecy of Famine," Thames and Hudson, London, 1953.
9. G. Ordish. "Untaken Harvest," Constable, 1952.
10. J. Oser. "Must Men Starve," Jonathan Cape, London, 1956.
11. F. Osborn. "Our Plundered Planet," Faber and Faber, London, 1948.
12. F. A. Pearson and F. A. Harper. "The World's Hunger," Cornell University Press, New York, 1945.
13. P.E.P., 1955, World Population and Resources, George Allen and Unwin, London, 1955.
14. E. I. Rabinowitch. "Photosynthesis and Related Processes," Vols. I and II, Interscience, New York, 1951.
15. Sir John Russell. "World Population and Food Supplies," George Allen and Unwin, 1954.

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BOOK REVIEWS

All about Potato Processing

THE history of the potato has been traced back to 200 A.D., when it was being cultivated in Peru, and we are told that even at that time a primitive form of dehydration was practised, potatoes being allowed to freeze at night and thaw during the day, the juice being expressed from the potatoes by treading with bare feet. This cycle was repeated several times until the moisture content was reduced sufficiently to preserve the potatoes. Potato processing has expanded rapidly since 1946, and the processing industry at the present time uses, in the U.S.A., from whence this book* originates, about one fifth of the potato crop. The book is believed to be the first to cover all aspects of potato processing, and the sections, numbering 20 and covering such topics as structure and chemical composition, diseases, effect of transit and storage, nutritive value, potato chips (or crisps, as they are called in this country), frozen potato products, dehydration, potato starch and flour, are each written by a specialist. It is well illustrated with plates, tables and drawings, and an extensive bibliography at the end of each section provides a key to published work. An index completes this informative and useful compendium.

* *Potato Processing.* By William F. Talburt, M.S., and Ora Smith, Ph.D., in collaboration with a group of specialists. The Avi Publishing Co., Inc., Westport, Conn., U.S.A., 1959. Pp. 475, 113 figures. $9.50 (domestic); $10.50 (foreign).

Britain's Cheeses

CHEDDAR, Cheshire, Caerphilly, Dunlop and Wensleydale are just a few of the world-famous varieties of British cheeses. The making processes of these, together with Stilton—"the king of cheeses"—and several others (including the soft and cream cheeses) are described in this Ministry of Food Bulletin.* Last reprinted in 1952, it has been completely rewritten by eight specialists well qualified to discuss particular cheese varieties and aspects of manufacture.

It covers in considerable detail the making of each variety on a commercial scale in creameries, and separately describes the farmhouse craft which is still of importance in the west Midlands and south-west England.

A comprehensive general section discusses such details as equipment, starters, tests, classification, grading and packing of cheese, by-products and laboratory control of milk, starters, plant equipment, fat content of cheese, etc.

There are 49 photographs, showing stages of manufacture of the different cheeses.

* Bulletin No. 43. *Cheesemaking.* 4th edn. Pp. 84, 23 plates. 7s. (7s. 6d. by post). Obtainable from H.M. Stationery Office or through any bookseller.

Trade Marks and Brand Names

THE foreword of this reference book* discusses the selection and protection of trade marks, explaining why, in many cases, it is in their own interest that firms should register their trade marks despite the fact that some people may think it is an unnecessary expense. The method of protection and the duration of the registration are also dealt with, as are the various classes of goods which this book sets out to cover.

Various other useful items of information in connection with trade marks and brand names are explained before one comes to the object of the work, a directory of trade marks and brand names ranging from *Abaco* to *Zwan*.

* *Food Trade Directory of Trade Marks and Brand Names.* Food Trade Review, Ltd., London. Pp. 287. £3.

World Food Supplies: Sources of Food – II

REFERENCES

(*Concluded from previous page*)

16. L. D. Stamp. "Our Undeveloped World," Faber and Faber, London, 1953.
17. W. Vogt. "Road to Survival," Gollancz, London, 1951.

B. Symposia

18. J. De Castro (ed. by). "Science and Mankind," No. 1, World Association of Scientific Workers, 1958.
19. I. Le Gros Clark and N. W. Pirie (ed. by). "Four Thousand Million Mouths," Oxford University Press, London, 1957.
20. V. Subrahmanyan (ed. by). "Food and Population and Development of Food Industries in India," Mysore, 1952.
21. Symposium. "Agricultural Control Chemicals," 1950. Advances in Chemistry Series No. 1, American Chem. Soc., Washington, D.C.
22. Symposium. "The Impact of Food Technology on the Nutrition of Man and Animals," *Proc. Nutr. Soc.*, 1956, **15**, No. 2, 142.
23. "Man's Need for Water," *Proc. Nutr. Soc.*, 1957, **16**, No. 2, 103.
24. "Fish," *Proc. Nutr. Soc.*, 1958, **17**, No. 2, 122.

C. Official publications, national and international

25. "World Food Survey," F.A.O., Washington, D.C., 1946, and subsequent Reports (F.A.O., Rome).
26. "Synthetic Fats," F.A.O., Washington, D.C., 1949.
27. F.A.O. Report, Special Series VI/13, 1951, October 31, p. 3.
28. "Partners in Progress." A Report to the President by the International Development Advisory Board (Washington, D.C., U.S. Govt.).

D. Reviews and other papers

29. A. L. Bacharach and T. Crosbie Walsh in (19).
30. D. S. Bhatia and G. S. Bains. FOOD MANUFACTURE, 1956, **31**, 376.
31. C. Clark. *Nature*, 1958, **181**, 1235.
32. Editorial. FOOD MANUFACTURE, 1952, **27**, 487.
33. C. M. McCay. *New York State J. of Med.*, 1952, **52**, 304.
34. L. W. Mapson. *Brit. Med. Bull.*, 1956, **12**, 73.
35. H. W. Milner. *J. Am. Oil. Chem. Soc.*, 1951, **28**, 363.
36. H. Nicol. *J. Inst. Phys.*, 1958, **9**, 7; *Discovery*, April, 1956, XVII; *Chem and Ind.*, 1959.
37. N. W. Pirie in (19).
38. Sir J. Russell. Presidential Address, Brit. Asst. Advancement of Science, London, 1949.
39. S. R. Srinivarsan. FOOD MANUFACTURE, 1956, **31**, 156.
40. Editorial. FOOD MANUFACTURE, 1959, **34**, 398.

How Flour is Handled in U.S. Bakery

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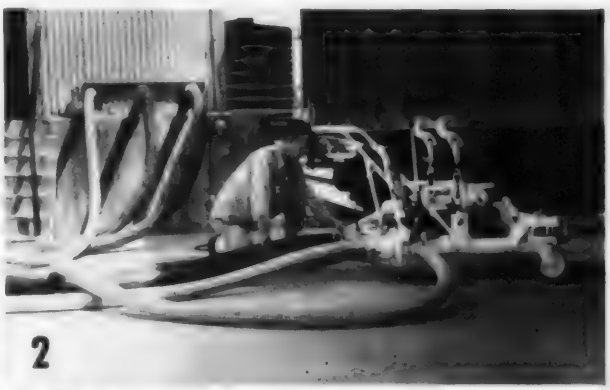
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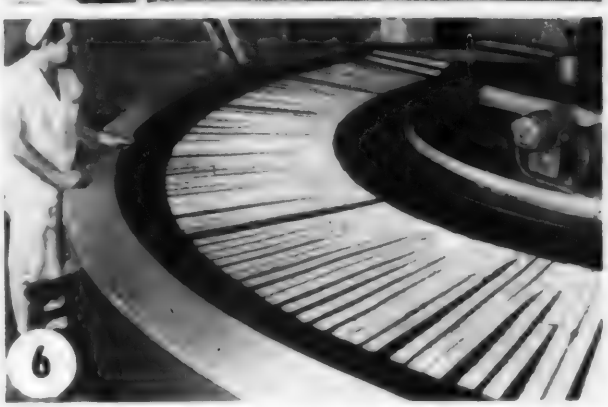
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Tote System uses Tilting Bins

The National Biscuit Co., of Denver, Colorado, which uses 20 tons of flour a day, last year installed a flour bulk handling method manufactured by Tote System, Inc. Flour, delivered in bulk, is conveyed pneumatically: 155 hermetically sealed bins, each of 74 cu. ft. capacity, are used both as storage and discharge hoppers. The bins are carried to the discharge point by fork trucks; gravity discharge is assisted by tilting the bins. Filling and discharging of the bins is controlled automatically from a panel. These pictures show the sequence of operations: **1.** *Five of these rail cars, each holding 100,000 lb., arrive every fortnight.* **2.** *Suction lines are connected to the car and the flour is unloaded by a combination of suction and compressed air.* **3.** *The 6-bin filling area where flour is delivered along a feed screw through 6 nylon sleeves; as the bins (each holding 2,800 lb.) are filled, control panel lights indicate the direction of flour flow, and as each bin becomes full, the flour is automatically diverted to the next on the line. When the last bin is full, the screw conveyor is automatically reversed and purged.* **4.** *Replacement of a full bin by an empty one takes less than 10 min. by fork lift truck; in storage, the bins are stacked two high.* **5.** *When needed, full bins are taken by fork truck to a 6-tilt panel controlled discharge point, consisting of 3 double tilts, each double unit handling one of the 3 types of flour. Bins are tilted to 45° for discharge; when one is empty, an automatic switch brings the next into operation.* **6.** *Part of one of the biscuit production lines.*—A. E. Williams.

FOOD MANUFACTURE reviews

PROTECTIVE CLOTHING

Although clothing should always be designed with the wearer's health, safety, comfort and appearance in mind, it is especially important in food manufacture that the food is completely protected from contamination by either the clothing or the wearer's body.

THE most likely source of contamination are the hands, nose, mouth and hair. Those sources can be covered (to protect the food) by means of gloves, masks and hats or caps. Any worker with a cold in the head or hay fever should wear a simple but effective mask; if he is not prepared to submit to this rule, he should not be allowed in the factory or catering establishment. The wearing of such masks is common practice in some countries, even in the streets and public vehicles.

Rayon and acetate materials

Plain weave spun-rayon poplinette, or a viscose filament taffeta, combined with a pad of viscose staple, or with bonded *Fibroceta* wadding forms an effective mask, say Courtaulds, the makers of this material.

The principal requirements of hygienic clothes are that they must not readily shed fluff or loose short fibres, and they must be readily washed or dry-cleaned. From the point of view of the wearer the clothing should be light in weight and able to "breathe." Some of these conditions are obtained by the mesh vest which maintains an insulating layer of air next to the skin.

Lightness combined with warmth and comfort, and freedom from wet perspiration, is achieved, say the makers, by a mesh vest knitted from a 50/50 blend of the rayon and acetate staples of the Courtaulds Group (*Fibro/Celafibre*). The fibres being in a pure form and also of a uniform length of staple do not powder or fluff, *e.g.* when a male operative is wearing an open-necked shirt or no shirt at all. Cool, non-linting and readily washable gloves, more comfortable than rubber gloves, are available in *Simplex*-knitted Strong *Fibro*.

Caps should be worn by both female and male workers to prevent hairs or scalp dust from falling into food or drink. Suitable caps for females are those worn by nurses, namely in a plain weave

Industrial clothing made from "Terylene" can be smart and attractive as well as functional, as this overall coat shows.

"Bri-Nylon" overalls for men. (*Left to right*): Specially produced for food workers, particularly bakers, this suit by Clares (Wells), Ltd., has no buttons or buckles and fastens solely with ties. This up-to-date version of the butcher's traditional striped apron is made by Practical Uniform, Co., Ltd., and is being worn with a general purpose work coat by T. H. Lawton and Co., Ltd. The jacket, apron and cap of this modern chef's wear are made from a very hard-wearing blend of cotton and nylon by John Peck and Co., Ltd.; the trousers, in a traditional check, are made by Practical Uniform Co., Ltd., in nylon cloth woven from dyed yarn.

" Bri-Nylon " overalls for women by various makers. *(Left to right):* **Based on the man's traditional bib-and-brace overall, this garment is intended for women doing work where a skirt is an encumbrance; in a practical shade of green, it is produced by Nylon Garments, Ltd. White piping round the collar adds to the freshness of this simple but smart overall in cornflower blue by Harrimonde, Ltd. Wide revers give a neat touch of fashionable elegance to the neckline of this " shortie " by Keith Doring, Ltd., which is available in many shades. Knife-sharp pleating adds to the smartness of this overall by Harrimonde, Ltd., which has a three-quarter sleeve style with button-through front.**

fabric of 50/50 *Fibro* and cotton stiffened by means of an interlining of cotton and *Courlene* (Courtaulds polythene yarns). In constructing the caps the cloth is hot-pressed so that the *Courlene* threads fuse the two outer layers of cloth to the interlining thus forming a composite assembly. Such a semi-stiff construction is also suitable for cuffs and collars for protection when appropriate.

Dyestuffs used for coloured protective overalls, must be fast to washing at the boil without staining or rubbing off. Man-made fibres possess a distinct advantage over natural fibres in that insoluble fast-coloured pigments can be incorporated into the spinning solution to produce a coloured fibre in which the pigment is an integral part of the fibre. A 50/50 blend of such " spun-dyed " *Fibro* (Courtaulds registered trade mark for their spun-dyed rayon staple is *Fibro-Duracol*) with cotton is a satisfactory lint-free fabric for overalls since the long and regular rayon staples intimately blended with cotton fibres exert a binding effect on the natural fibres, as *Fibro* also does with wool or asbestos fibres—an appropriate length of staple being selected.

Regatta or drill overall fabrics of the blend of 50% *Fibro*/50% cotton can be satisfactorily stabilised against washing shrinkage by compressive relaxation shrinkage as by the *Sanforized* or *Rigmel* finishes.

It is claimed that such blends do not acquire static electrical charges as do wool and some synthetic polymer fibres. Static electricity on textiles attracts dust and any other powders carrying an opposite charge. The blend of *Fibro* and cotton is claimed to possess a longer life than the corresponding 100% cotton garments.

Shirts, blouses and dresses made from a continuous-filament viscose warp and a spun-*Fibro* yarn weft are said to be particularly suitable for wearing in food or catering establishments because of their ease of washing and ironing and the fact that they do not readily shed fibres. Such shirting and blouse fabrics are available under the trade mark *Escorto*. Attractive coloured stripes and check effects can be obtained by the use of Courtaulds filament viscose *Duracol* (fast colours) and the cloths have a " minimum-iron " finish.

Trouserings and suitings from blends of 85% *Fibro*/15% *Nylon*, for example those sold under the trade mark *Flanlon*, possess many of the merits indicated above for the food production and catering industries. If special effects, *e.g.* pleated skirts or dresses are required, then blends of two-thirds *Tricel* and one-third *Fibro* can be used either in woven or knitted form. *Tricel* is the British Celanese fibre which can be heat-set to form permanent pleats and which is also highly resistant to heat and therefore suitable for wear near ovens and boilers.

Nylon

Large quantities of nylon garments are worn by workers employed in the food manufacturing industries. It is claimed that their ease of washing, speed of drying and the fact that they need no ironing if they are allowed to drip-dry make it easy to achieve the necessarily high standards of hygiene and cleanliness. Coupled with this, their remarkable hard-wearing qualities make them a long-term economy.

The unusual diamond shape of the collar adds to the individuality of this "Bri-Nylon" overall by G. W. H. Smith and Co., which has deep pockets.

The name *Bri-Nylon* has been adopted recently by British Nylon Spinners, Ltd., the producers of the nylon yarns, and may be used on overalls only by manufacturers who are licenced to do so. This licence is granted only to firms using the correct nylon yarns in the correct way and whose merchandise meets the quality standards set by B.N.S.

In the food manufacturing industries the majority of *Bri-Nylon* overalls are made from a plain-woven fabric of about 4 oz. sq. yd. This has become very well established during the past few years, and is now more or less a standard cloth. Recent developments, however, are now leading to still further improvements.

Identical fabric is now being woven from a new fully dull nylon yarn which has been introduced recently. It is claimed to have all the hard-wearing, easy care virtues which have made nylon so popular, but to have considerably better appearance than the standard fabric. The main differences are that it has a denser, more matt, appearance and better opacity. At the same time new dyestuffs are being introduced. These have been developed specially for nylon and set new high standards for fastness and evenness. On the new fabric the colours are denser and there are many extremely attractive new shades.

Among the firms licenced by British Nylon Spinners, Ltd., to use the trade name *Bri-Nylon* is the Practical Uniform Co., Ltd., who report a growing output of nylon garments in addition to their range in cotton, rayon and other fibres. They say that at a Middlesex ice cream factory, each of the 160 women employees was supplied with two yellow nylon overalls by them which were still in excellent condition after more than two years wear, which compares with six conventional drill garments per employee per year. They say that two nylon overalls per employee are perfectly adequate because they are washed on the premises at only a fraction of the cost of commercial laundering, and the employee is provided with a fresh overall daily.

Terylene

I.C.I., Ltd., makers of *Terylene* polyester fibre, say that this material is being increasingly used nowadays for overalls in the food industry, particularly where abrasion resistance, hard wear and ease of cleaning are important.

One of the outstanding properties of this material is its acid resistance, and it is in this field, say the makers, that *Terylene* garments are most widely and successfully used.

Continuous filament *Terylene* fabrics are available in a wide range of colours and surface effects in weights from 3 oz. to 8 oz. This diversity of fabrics means that lightweight overalls can now be both functional and attractive. The use of textured filament yarns has made it possible to develop heavier weight fabrics with high cover fabrics, but for the most part fabrics of 8 oz. and over designed for boiler suits, warehouse coats, etc., are woven from staple *Terylene* yarns. These staple fabrics are also offered in a wide variety of weights and colours.

In the lightweight field 100% *Terylene* fabrics of 3-4 oz. per yard are being increasingly used for waitresses overalls, house frocks, etc., and combine exceptional smartness with the easy care qualities of *Terylene*. These garments are proving very popular and one organisation has reported an interesting and unexpected result of their use, namely that the general efficiency of the wearers has improved as a result of the psychological fillip afforded by these smart new overalls. The latest of the lightweight fabrics is that made from an intimate blend of 67% *Terylene* with 33% cotton, and overalls made from such fabrics combine the handle and appearance of cotton with the performance of *Terylene*. Some

This "Bri-Nylon" overall by T. H. Lawton is made from fabric with a "linen finish," which is claimed to be completely permanent, to improve opacity, to add surface interest and ensure that the garment always looks fresh and neat.

heavier weight fabrics in this blend have also been produced (6-8 oz.) and these clearly have a great deal to offer to users of tropical uniforms, medium weight boiler suits, boy scout uniforms, etc., where extreme toughness and lasting smartness are of importance.

The most recent developments are coated twistless *Terylene* fabrics which are claimed to have tremendously increased tear strength and, therefore, greatly increased life. Their extreme toughness, lightness and flexibility, say the makers, make them particularly suitable for use in the most arduous conditions, and among the applications for which they are suitable is chemical crop spraying.

Among firms using *Terylene* material for making overalls, as well as nylon and the more conventional cotton, is the Whaley Bridge Manufacturing Co., Ltd., who expect soon to provide overalls and aprons in the new proofed nylon and *Terylene*, which are proofed against water, oil and dust, and in the case of the latter, against acid as well. Perhaps the point of greatest interest where food processing is concerned, say this firm, is the way in which the proofed *Terylene* resists animal fats, which appears to be the answer to a problem which has been engaging them for some time.

These polythene gloves made by Mark Anthony, Ltd., are disposable.

P.V.C. and polythene

James North and Sons, Ltd., announce the introduction of a new range of P.V.C. aprons which are claimed to be fat and oil resistant as well as to provide protection from chemicals and abrasion. Among the activities for which these aprons are said to be very suitable are dairying, slaughtering, meat and bacon processing and handling, and fish and poultry processing. These new aprons are claimed to have increased resistance over normal P.V.C. aprons to the extent of seven times in the case of animal fats, olive oil and white spirit, and greatly increased resistance to mineral oils and petrol. The aprons are available in four different sizes and three colours, brown, black and white.

In addition to their normal range of both plain and printed polythene full length garments, and shoulder covers, Mark Anthony and Sons, Ltd., are now manufacturing polythene gloves. This is an entirely new project, the gloves being made in various gauges to suit particular requirements. They are economical enough to be disposable, and can be bought either in bulk quantities or in dispenser packs containing 24 interchangeable gloves.

This Northide P.V.C. apron is available in 4 sizes and 3 colours and is especially resistant to chemicals, oils and fats.

Clothing hire

Advance Linen Services, Ltd., say that a contemporary range of attractive garments which departs from traditional overall styles without in any way lessening their protective qualities has been added to the Monogram Overall Service, which for some years has been hiring high quality protective clothing for both men and women on a replacement basis.

The firm say that as a result of an exhaustive investigation by their research and development department into fabrics, Regatta cloth has been chosen for the new collection as being not only attractive in appearance but having good handling and draping qualities, being strong but not heavy, being capable of washing many times without shrinkage or loss of colour, and being resistant to tear and abrasion. In addition, the range is available in opaque nylon in a choice of shades. The firm also say that the garments have been made up in accordance with the B.S.I. specification for stitching tension, seam allowance, etc., special attention being given to the buttons to ensure that they will not break, crack or discolour during laundering and so shaped that they will not collect dirt.

Clothing made by the disabled

Finally, we draw readers' attention to the range of protective clothing made by Remploy, Ltd., an organisation which, with Government assistance, employs disabled people to manufacture a wide range of goods at strictly competitive prices. The range of protective clothing made by this firm includes a full range of standard and industrial gloves, industrial overalls made from preshrunk Lancashire cloth in fast-dyed colours, boiler suits, leather aprons, sleeves and leggings to provide protection under a wide variety of conditions.

Machinery and Equipment

CONTINUOUS FREEZING OF FRIED POTATOES

Smooth stainless steel band conveyors supplied by Sandvik Steel, Inc., are being used at the new frozen foods plant of the Idaho Potato Processors, Burley Idaho, U.S.A., to convey French fried potatoes through the freezing tunnel. These bands, it is claimed, not only improve the quality of the product but require little maintenance in service. They are made of cold rolled 18-8 quality stainless steel, 32 in. wide by 0·032 in. thick, specially trued and flattened at the mill for conveyor application.

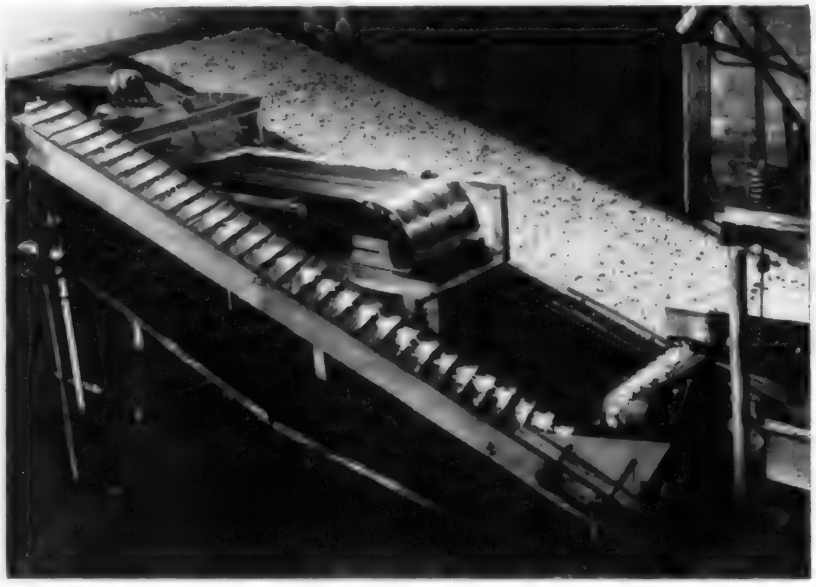
The installation has three conveyors, one for cooked French fries, another for uncooked French fries and a third for potato patties. The conveyor for cooked French fries is 8 ft. wide and comprises three of the 32 in. wide stainless steel bands running side by side about one eighth of an inch apart. The conveyor for the patties is 32 in. wide and mounted on the same frame as the bands for the uncooked French fries, being separated from them by a divider. The three conveyors are of unequal lengths and extend different distances into the processing room. Each trio is driven by a small 3 h.p. motor.

The installation of the bands requires them to be threaded over the framework. The ends are then pulled together and overlapped with a standard band-stretcher, holes are punched for rivets and the rivets are driven, thereby completing the splice. The steel bands have V-ropes bonded to their inside circumference and these ropes travel over V-rope end sheaves which ensure true tracking and also transmit power to the band at the drive end.

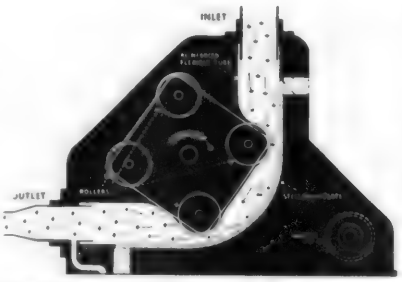
The take-up springs keep them under constant tension despite any expansion and contraction encountered due to the wide range of temperatures, −40°F. to room temperature, to which the bands are subjected.

The bands are supported on lengths of laminated plastic arranged parallel to the direction of travel, the laminated blocks being supported by cross-members. There are, therefore, no idler rollers to freeze and almost no vibration. In actual fact, a small amount of moisture freezes on the plastic supports and the bands slide along on ice.

Idaho Potato Processors report that the product does not stick to the band but falls off without scraping, as the band flexes around the discharge sheaves. Further, the smooth dense stainless steel surface presents no lattice-work or grid to damage the product. The design, manufacture and installation of this type of conveyor is undertaken in U.K. by Sandvik Steel Band Conveyors Ltd.



French fried potatoes being taken from the defatter up to 32 in. wide Sandvik stainless steel conveyor belts which carry them through the freezing tunnel at the plant of the Idaho Potato Processors, Burley, Idaho, U.S.A.



The Simon "Squeegee" solids pump for conveying any kind of fluidised powdered material at up to 8,000 lb. hr.

SOLIDS PUMP

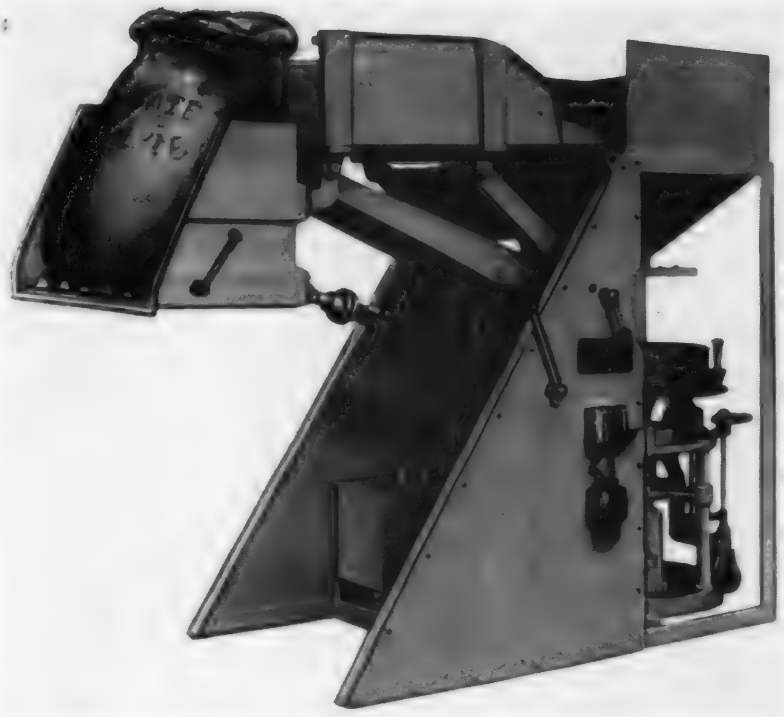
A new solids pump, specially designed for the short-transfer conveying of powders, has been announced by Henry Simon, Ltd. Known as the *Squeegee* solids pump, it will convey practically any type of powdered material providing it can be fluidised by air. Conveying rates, depending on the material handled, range up to 8,000 lb./hr. Vertical lifts up to 70 ft. with total conveying lengths of 200 ft. are being achieved under normal working conditions.

FLUID FILLER

The latest addition to the range of filling machines made by Mather and Platt, Ltd., is the high-speed fluid filler which has been designed to bring the versatility of their 4 nozzle automatic filler into line with the demand for higher speeds and greater accuracy. The 4 nozzle machine which was originally designed for the filling of jam is still in production.

The first of the new fillers is fitted with the necessary parts, including the automatic can feed, for the handling of 1 gal. rectangular cans, but the same basic machine can be supplied with change parts for the handling of round, open-topped cans. One feature of the machine is that it can be adapted to handle almost any shape or size of can from the 1 gal. rectangular can down to the ½ pt. can.

The filling head normally carries 12 nozzles and is fed by the pump unit through an easily removable flexible tube. Various types of nozzle may be fitted to the filling head to suit the particular product being handled. The cans are fed to the machine on a slat band conveyor. A safety device is fitted which will stop the machine if there should be any interruption in the supply of cans, or if a can should at-



The " Liftip " made by Russell Constructions, Ltd., for lifting sacks, drums, bins, etc., can be positioned close to the receptacle into which discharge is made.

tempt to enter the machine in the wrong attitude.

The drive incorporates two variable speed gears, one on the pump unit which varies the rate of flow of the product, and the second on the filling head which controls the rate of throughput of the cans. The controls for these two variable speed gears are conveniently situated on a control panel each with its speed indicator.

On round containers such as pt. and ½ pt. cans, it is expected that it will be possible to achieve speeds of well over 300 cans per min. without any loss of accuracy.

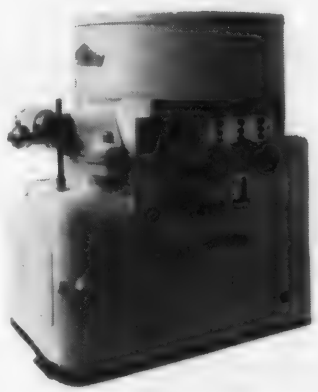
VACUUM FILLER

The latest machine to be added to the range of machinery supplied by Foodtech, Ltd., is the *Contifiller*, a continuous vacuum filling machine which, it is claimed, can be used to fill any kind of product into cans at exact weights.

Any shape tin can be filled with exact quantities from ¼ oz. up to 10 lb., it is claimed. The machine is continuous in operation, being fed from the large hopper on top of the machine. The whole process is described as entirely automatic.

The machine may also be used for stuffing casings; artificial casings, for example, may be filled at exact weights and under vacuum so that the products are free of air pockets.

The machine can also be used with an automatic sausage linker, the Rohwer A.F., which is capable of linking 200 sausages per min. By this means, it is capable of producing up to 25 lb. of sausages per min.



This "Contifiller" vacuum filling machine is the latest to be introduced by Foodtech, Ltd., and is claimed to fill any shape tin with exact quantities from ¼ oz. to 10 lb.

GLASS VALVE

The development of a new screw-type glass valve, suitable for use where corrosive liquids are to be conveyed, has been announced by QVF, Ltd.

The 1 in. valve features a *fluon* bellows with glass-fibre loaded *fluon* seat. The bellows are claimed to eliminate the need for any form of packed gland. Maximum operating pressure is 50 p.s.i.

The valve had been developed from one originally designed by their German subsidiary company, QVF Glastechnik, Wiesbaden.

LIFTER AND TIPPER

The *Liftip* made by Russell Constructions, Ltd., has been designed to lift and tip sacks, drums, bins, etc., and can be positioned close to the receptacle into which discharge is to be made.

The machine has a steel frame with two lifting arms operated by independent hydraulic rams which lift and tip the hopper holding the container. The drive is by a 3 h.p. 400-440, 3-phase, 50 cycle, 1,425 r.p.m. electric motor coupled direct to a hydraulic pump.

The machine weighs approximately 5 cwt. and can lift and tip up to 6 cwt. and will discharge at heights from 3-8 ft. The unit can be supplied on wheels.

The steel hopper, which is an optional extra, equipped with valve, is bolted to the main frame. Quick release screw clamps are provided for holding the drum, bin or carton in position and for sacks a special retractable steel claw is provided.

Pre-lubricated self-aligning bearings are used throughout and maintenance is almost negligible. The unit is of robust construction, is silent in operation, and is capable of continuous 24 hour duty.

PALLET LOADER

A new pallet loading machine which was displayed recently, has been designed by Gimson and Co. (Leicester), Ltd.

Originally designed for moving and stacking bottle crates, it has now been adapted for stacking boxes, crates, cartons, etc.

Two machines have been designed, one stacks 30 standard one dozen 26 oz. size cases in 5 layers of 6 cases per layer, and turns the pallet through 90° after each layer is stacked to interlock the load. Cases are fed to the loader along a gravity roller conveyor, which is arranged to suit individual requirements and a timing device permits only three cases to pass forward at a time. These cases are then lifted and moved on to the pallet, which is housed on a revolving turret. The second delivery of three cases is similarly transferred to the pallet and simultaneously a timing device operates, moving the turret with the partly loaded pallet on it through 90°. On the original model the pallets were placed by hand upon the turret and the full pallets were removed by fork or pallet truck to storage, but the makers state that developments are well under way to arrange for the automatic feed and discharge of the pallets.

The second model differs from the first in so far as there is no turret. This

is not necessary with interlocking crates which require no bonding. It is easy to install, though a suitable supply of compressed air is required. If necessary, the machine can be supplied with a built-in motor-driven air compressor.

The pallet loaders will handle approximately 1 thousand 20 bottle crates, cases or cartons per hr., and the rate can be varied to suit customers' requirements.

VIBRATORY CONVEYOR

A new type of vibratory conveyor which is claimed to be considerably cheaper than the conventional magnetic design has been developed by Sinex Engineering Co., Ltd. It is claimed to have all the advantages of the magnetic conveyor (except that it has a fixed rate of feed), *i.e.* few moving parts, low maintenance requirements and silence of operation. It is particularly adaptable where very little headroom is available. Applications for which it is specially suited are those involving the simple transfer of material from one point to another; the feed can be stopped or started at will and although the speed of travel remains constant the level of material can be altered by means of a gate to control the amount being fed.

The vibratory conveyor, the length of which is adapted to customers' requirements, comprises a feed trough fitted with a pair of the new standard SV range of Sinex electric vibrators, one on each side of the trough. The vibrators are mounted with their shafts in a vertical plane but inclined at a specific angle to provide a feed of material in one direction along the trough. Each conveyor can be supplied complete with base structure or with simple mountings for attachment to the customers' own equipment. The only moving parts employed are the rotors of the vibrators. Vibrators can be quickly replaced if this eventually becomes necessary, by virtue of their 4-bolt lug mountings.

BAG FLATTENING

Recent experiments at the works of Sinex Engineering Co., Ltd., have shown that many types of granular materials, after filling into paper sacks, can be flattened and compacted by passing them over a vibrating table.

The tables were developed for compacting precast concrete, and standard units from 12 × 12 in. to 6 × 4 ft. are used for this purpose. The principal advantage claimed is that the contents are not submitted to any mechanical pressure and, consequently, neither the sack nor the contents are crushed or damaged. The space taken for storage or transport of the filled sacks is reduced by up to 20%.

When placed on the table, it is said that 1 cwt. sacks can be moved with one finger, due to the reduction of friction by vibration; consequently, when

(*Top*): **The Sinex vibratory conveyor.** (*Bottom*): **The redesigned Sinex bowl type vibratory screen.**

passed over the table on a rubber belt there is negligible friction on the underside of the belt.

VIBRATORY SCREEN

The suspended bowl type of vibratory screen manufactured by Sinex Engineering Co., Ltd., has now been redesigned to enable users to fit new wire or nylon mesh screens themselves without having to obtain replacements from the makers. The previous design made use of a screen mounted on a beechwood ring, supplied as a complete assembly; in the latest model, however, the wire mesh is simply folded upwards round the edge of the bowl and held in position by a circular clamp.

This development, say the makers, will make screen replacement a cheaper procedure, and will eliminate the need for stocking a range of screen assemblies.

MATERIALS HANDLING

Powell Duffryn Engineering Co., Ltd., have been appointed the licenced manufacturer for the U.K. and Europe of the entire range of *Dempster-Dumpster* container handling vehicles and equipment by Dempster Brothers, Knoxville, U.S.A. The equipment is mounted on standard commercial road vehicles and the range consists of vehicles in four series with containers in a great variety of types and sizes.

In the L.F.W. series of seven models, vehicles will lift, transport and dump from 6,000 lb. to 50,000 lb. net loads in containers ranging from 1 to 15 cu. yd. capacity in a variety of types. The G.R.D. will handle any of the same size and capacity containers with a maximum lift of 9,000 lb. net, to a dumping height of 10 ft. clearance.

The *Dumpmaster* series have bodies of 18, 24 and 30 cu. yd. capacity with hydraulic compaction of up to 3 to 1, and will self-load from containers of 1 to 6 cu. yd., picking up automatically and lifting net loads of up to 6,000 lb. per container.

The Dinosaur can hydraulically pick up or put down on ground, on wharf, on lorry or on flat rail car its own body, loaded or empty. Both sizes range from 10 cu. yd. to 40 cu. yd. in a variety of designs according to intended use.

In the appliances all operational movement is effected by hydraulic rams pump driven by power take-off from the vehicle gear-box, and controlled by the driver from the cab.

PIPE THERMOCOUPLES

Pipe thermocouples made by the Cambridge Instrument Co., Ltd., are designed for checking temperatures of piping of a wide variety of diameters. They can be used for either short duration temperature tests in industrial plants, or for permanent temperature indicating systems in office blocks, hospitals, etc.

In tests of short duration they are normally used in conjunction with a portable indicator.

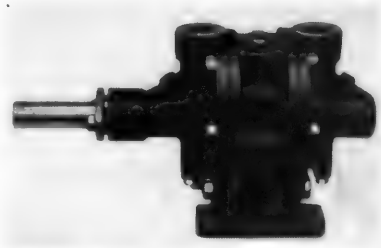
For permanent use in buildings, a number of pipe thermocouples are attached to pipe heating systems at intervals on different floors or in different rooms, and joined to a Cambridge Multipoint indicator. It is claimed that a direct reading from the actual heating source of each room can be obtained.

The pipe thermocouple is suitable for measuring temperatures up to 300°C. (600°F.).

VALVELESS PUMPS

Of special interest to the food industry is the range of patented "P" type rotary plunger valveless pumps manufactured by the Pulsometer Engineering Co., Ltd., for pumping viscous liquids at high or low pressures. Their construction is claimed to allow these pumps to deal satisfactorily with such substances as chocolate, syrups, glucose, glycerine, margarine, etc.

The pumps, which are described as simple radial cylinder pumps, have no valves and, it is claimed, require little or no adjustment or replacement and are not subject to excessive wear. They are said to be quiet in operation



A "P" type rotary plunger valveless pump made by the Pulsometer Engineering Co., Ltd.

and designed to run in either direction, reversal of rotation causing a reversal of suction and delivery openings. They are available in sizes from ¾. in to 1½ in. and cover an output of from 275 to 1,100 g.p.h. at a maximum running of 1,000 r.p.m.

The pumps consists of a casing, two covers, shaft, triple plungers and cylinders which are located on the plungers and held against the face in the casing by two deep triangular cover spigots. The cylinders merely float on the plungers and are relieved of side thrust.

The standard pumps are made in cast-iron with malleable iron shafts up to the 1¼ in. size and steel shafts for the larger sizes. Should the nature of the liquid being pumped call for it they can also be supplied in gunmetal or with gunmetal running parts and with phosphor bronze or stainless steel shafts.

The overall dimensions are from 12¼ to 18⅜ in. in length, 6⅛ to 10⅜ in. in height, and weigh from 21 to 80 lb. These pumps can be supplied direct-coupled to electric motors or engines.

POLYESTER SELF-ADHESIVE TAPES

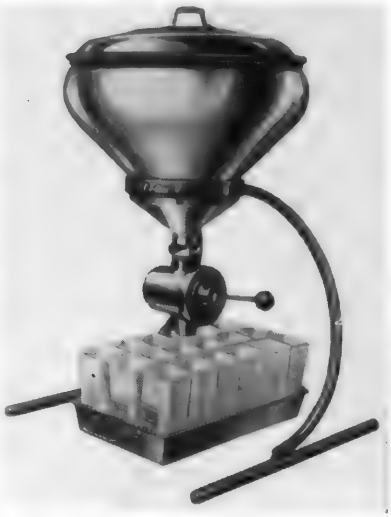
It is claimed that a new pressure-sensitive tape with a thermosetting adhesive overcomes the problem of deterioration when stored. Under normal conditions the tape is said to have a shelf life of six months or more.

In use, once the adhesive is set it is no longer pressure sensitive and the tape therefore can be said to give a permanent bond. The film and the adhesive are then completely unaffected by temperatures of up to 180°C.

Obvious advantages are claimed for the new tape in heat resistance and grip over those with thermoplastic or thermostable adhesives. Under heat, there is no softening of the adhesive, usually associated with loss of grip.

Electrical assemblies which are heated in manufacture or during service can quite safely incorporate this high temperature tape. Thermoplastic adhesive tapes break down, for example, in potted assemblies, causing soft spots, and in any electrical apparatus where heat is present.

The tape is available in 72 yard rolls, on 3 in. diameter cores, in a variety of widths ranging from ½ in. upwards.



The "Full Fix" fat dispenser marketed by Amasal, Ltd.

Already available in the *Sellotape* range but complementary to the new thermosetting one is another high temperature polyester tape which has a heat stable silicone adhesive. This pressure sensitive electrical tape can be used in temperatures of up to 140°C. for long periods. It is available in 25 yard rolls in widths from ½ in. upwards.

FAT DISPENSER

Handling hot fat to transfer it into containers for sale can be a dangerous operation, but the new *Full Fix* automatic fat dispenser marketed by Amasal, Ltd., is claimed to make it a perfectly safe undertaking.

This machine has a patent measuring cock so that at the touch of a lever a container is filled with precisely ½ lb. of fat, with no danger of burnt hands. The dispenser is claimed to be easy to use, absolutely safe and accident-proof, and the operator can do the filling sitting down.

ELECTRIC VALVE ACTUATOR

A heavy duty electric motor for operating butterfly and rotary stem valves, dampers and louvres or vertical acting slip stem valves, is now available from Honeywell Controls, Ltd. Known as the *Actionator*, it consists of a reversing capacitor type motor with a gear train to give the required timing. Various speeds are available ranging from 9.0 secs. to 144 secs. for 180° rotation or full stroke operation. Torque output is high, up to 200 lb. in. and there is an internal brake to hold the load in any position without hunting or coasting when the motor is de-energised.

Models are available for two-position, floating or proportional control action.

Cam-operated micro switches control the extent of motor travel in either

Stable control of butterfly and rotary steam valves, dampers and louvres is achieved with this fast-acting "Actionator" electric motor, say the makers, Honeywell Controls, Ltd.

direction and up to four auxiliary switches of the same kind can be incorporated. A retransmitting slidewire can be substituted in the proportional control model.

FAN

A new 12 in. model of the *Expelair* fan was recently introduced by Woods of Colchester, Ltd. The new model is stated to be reversible, draughtproof and capable of removing 60,000 cu. ft. of air per hr.

A built-in cord-operated iris shutter is linked with an integral fan switch, the fan being switched on and off as the shutter is opened and closed. The direction of air flow may be reversed by turning the socket connection from the mains supply through 90° or, alternatively, by use of a reversing controller which gives four speeds in either direction and an off position. The rate of air flow may also be controlled by the dual speed motor. There is also a fan speed regulator.

Mac Fisheries of Fraserburgh

(*Concluded from page 96*)

these old methods are more deeply understood, modern methods of control and hence of improvement of quality can be brought into operation. By such means does industry progress, and the fish industry, perhaps because it has further to go than many, can profit greatly.

SOME SUPPLIERS OF EQUIPMENT

Avery, Ltd.: scales.
Fisadco, Ltd.: filleting machines.
J. and E. Hall, Ltd.: refrigeration compressors.
Honeywell Controls, Ltd: temperature control equipment.
F. Powers, Ltd.: semi-auto wiring machine.
Snelling, Ltd.: smoking kilns.
Wood, Ltd.: fans.

New Bulk Sugar Terminal in British Guiana

A plant for shipping raw sugar in bulk to cargo ships is now being built on the banks of the Demerara River near Georgetown, British Guiana. This drawing shows what the plant will look like when it is finished at the end of this year. A coaster is being unloaded and an ocean-going vessel loaded. Owned and operated by Demerara Sugar terminals, Ltd., and built by Simon Handling Engineers, the terminal will receive sugar from lorries at 100 tons/hr., or from barges and coasters at 200 tons/hr., and discharge to ship at 500 tons/hr., all operations taking place simultaneously if necessary. The two store buildings hold 40,000 tons, and sugar will be transferable from one to the other at 200 tons/hr.

Lorry-borne sugar is weighed and tipped into an intake hopper and conveyed to the junction house between the stores. Barges and coasters are unloaded on either side of the jetty on the right of the picture by two traversing crab and grab unloaders. The grabs discharge into hoppers from which the sugar is conveyed to the weighing house in front of the stores, and from thence to the junction house. From here the sugar is distributed to the stores by steel band conveyors and mobile ploughs. For loading, sugar is taken from hoppers in the floor of each store to the foot of the junction house, conveyed to the weighing house, and delivered to the centre of the ship-loading gantry for feeding to either or both of two shuttle conveyors each supplying a retractable travelling conveyor with a telescopic chute at its end. The chute can be positioned over any part of a ship's hold.

Dairy Products

(*Concluded from page* 101)

10. F. V. Yshemirskii. *Mol. Prom.*, 1958, **8**, 19.
11. E. G. Pont and L. F. Gunnis. *Aust. J. Dairy Tech.*, 1958, **2**, 13.
12. Popiel, Zofia and Broniszewska, Prace. *Inst. Przem. Mlecz*, 1958, **1**, 5.
13. J. Masek *et alia*. Czech. Pat. 88,333 (1959).
14. T. W. Adkins. French Pat. 1,141,902 (1957).
15. D. M. Graham. *J. Dairy Sci.*, 1958, **8**, 41.
16. H. Saal. *Amer. Milk Rev. and Milk Pl Mon.*, 1958, **10**, 20.
17. W. W. McCadam and H. Leber. *J. Dairy Sci.*, 1958, **9**, 41.
18. N. Galanin and N. Colovkin. *Kholod. Tekh.*, 1954, **2**, 31.
19. J. J. Mol. *Missets Zuivel*, 1959, **20**, 65.
20. T. Storgards and O. Aule. Int. Dairy Congress, 1959, **2**.
21. N. Dimon and D. Voinov. *Nauch Trud Selskostop*, Inst. "G. Dimitrov," 1957, **7**.
22. A. Kulebyukin and M. Lutskova. *Mol. Prom.*, 1958, **8** (17), 19.
23. H. Mulder. *Alg. Suivelbl*, 1958, **19**, 51.
24. D. M. Irvine and W. V. Price. U.S. Pat. 2,850,390 (1958).
25. *Amer. Milk Rev. and Milk Pl. Mon.*, 1958, **10**, 20.
26. J. J. Mol and J. Stadhouders. *Missets Zuivel*, 1958, **45**, 64.
27. H. A. Toulmin. U.S. Pat. 2,823,128 (1958).
28. H. A. Toulmin. U. S. Pat. 2,834,684 (1958).
29. B. Weinstein. U.S. Pat. 2,856,289 (1958).
30. *Ice Cream Rev.*, 1959, **6**, 42.
31. P. White and H. L. Bowmer. U.S. Pat. 2,848,337 (1958).
32. M. E. Schulz. *Milchwissenschaft*, 1959, **9**, 13.
33. E. A. Lauder and A. Z. Hodson. U.S. Pat. 2,832,686 (1958).
34. L. V. Rogers and Helen H. Welton. *J. Dairy Sci.*, 1959, **1**, 42.
35. M. Chatelain. French Pat. 1,161,006 (1958).
36. A. Khrul'Kevich. *Mol. Prom.*, 1959, **2**, 20.
37. F. B. Davison. *Aust. Ed. Manuf.*, 1958, **7**, 27.
38. S. Kende and F. Ketting. Int. Dairy Cong. (2), 1959.

Brewing

(*Concluded from page* 106)

The future

The year 1959 saw the publication of a great deal of necessary fundamental researches into continuous processes, the use of Nylon 66, hop utilisation, the yeast cell and many other problems. These works have had the effect of rendering the industry still more scientifically minded and it would not be too optimistic to predict the practical application of the results in the very near future. It is being realised now that there are considerable improvements in quality and great savings to be obtained by their employment. The tendency of brewery companies to form groups is a point in favour of the initial expense involved in modernisation, an initial expense which can show a quick return as a result of labour savings and a much greater control over the whole process.

Advances in Food Technology

ANALYSIS

Determining Diacetyl

A rapid method for determining diacetyl in food has been developed at the Agriculture and Food Department of the Warsaw College of Agriculture. Use is made of the formation of yellow quinone when weak diacetyl solutions are heated with potassium hydroxide.

Optimum sensitivity is obtained when using a Coleman type spectrophotometer, deep violet light of the order of 4,000 Å and 16 mm. diameter test tubes. The sensitivity of the method is stated to be raised to about 0·00005 mg. in 10 ml. of the distillate. A sample of 50-100 gm. is stated to be sufficient as regards to butter. The samples of butter or margarine may be accordingly smaller when determinations of the total content of acetoin (methylacetylcarbinol) and diacetyl are involved. — E. Pijanowski, *Przemysl Spozywczy*, 1958 (10), 429.

DAIRY PRODUCTS

Dried Milk Free Fat

Large increases in free (carbontetrachloride-extractable) fat from 10 to not more than 90% of total fat in foam dried whole milk resulted from ageing and lactose crystallisation in the concentrate (50% total solids) from which the product was prepared. It was found, however, that the effect was reversed by heating immediately before drying.

Homogenisation of the concentrate at increased pressure reduced the free fat content, which was also lower in products of smaller particle size. Dispersibility of the product decreased slightly with the increase in the free fat content. The fat rise under centrifugal force in reconstituted powder was not affected by variations in the free fat content to about 50%, but at higher free fat contents part of the fat readily separated out under centrifugation.—A. Tamsma, L. F. Edmondson and H. E. Vettel, *J. Dairy Sci.*, 1959, **42**, 240.

FISH

Herring Amino Acids

The seasonal variation of the free amino acids in herring is determined and it is concluded that histidine and taurine are the most important quantitively. No correlation was found between sexual maturity and content of total or individual amino acids.

In post mortem spoilage, the taurine content remained constant but the histidine content after a slight initial increase dropped to zero. Histamine developed 40-50 hr. after death. Three other imidazole-like compounds were also detected.

Leucine, valine, alanine, glycine, threonine and glutamic acid increased, but lycine and serine decreased. Aspartic acid and tyrosine, and arginine and methionine were apparent after 40 and 58 hr. respectively.—R. B. Hughes, *J. Sci. Food Agric.*, 1959, **10** (11), 558.

EDIBLE FATS

Synthetic Antioxidants

Thin-film chromatography, using films of silica-gel, is used for the detection of synthetic antioxidants in fats, using one-directional with $CHCl_3$ as a solvent, or two-directional systems with $CHCl_3$ and benzene as solvents.

After separation the film is sprayed with phosphomolybdic acid reagent, when the separated antioxidants appear as blue spots. Other developments include the exposure of phosphomolybdic acid treated films with ammonia vapours, 2:6 dichloroquinone chloroimide/ethanol solution, either neutral or sprayed with a borax/ethanol solution, and also diazotised sulphanilic acid. The method is described as being applicable to commercial methods.—A. Seher, *Fette Seif. Anstrichm.*, 1959, **61**, 345.

FREEZING

Cream Damage

The release of enzymes has been used to study the mechanism of the breaking of the emulsion in washed cream caused by freezing.

Centrifuging of thawed frozen cream gives an oil layer and a pellet composed of fat globule membranes which contains xanthine oxidase and alkaline phosphatase. There is a close relationship between the volume of free oil and the enzymic activity of the pellets. Rapid freezing leads to less coalescence of fat globules on thawing but storage at relatively high temperatures of such frozen cream leads to compaction of the globules. Slow freezing, on the other hand, permits redistribution of the fat membranes and coalescence of the fat on thawing. The best conditions for the freezing and storage of cream are those which give an even distribution of fat globules in a microcrystalline ice mass.—L. J. N. Cole, D. Kluepfel and C. V. Lusena, *Canad. J. Biochem. Physiol.*, 1959, **37**, 821.

MEAT

Connective Tissue Content

Connective tissue in meat has been determined from the difference between the total nitrogen content and the nitrogen extracted with 0·05 nitrogen-alkali at room temperature in 24 hr. The method has been applied to the grading of meat, higher connective tissue and elastin values being found in meat from young animals and low-grade animals.

The histological examination of treated tissues agrees with the results of collagen and elastin determination. —F. Lorincz and Ida Szeredy, *J. Sci. Food Agric.*, 1959, **10** (9) 468.

PECTIN

Aluminium Chloride Precipitation

Since raw materials like citrus peels and apple pomace used in other countries for the preparation of pectin are not available in India in any substantial quantities, indigenous fruits like papaya (*carica papaya*) and jack fruit (*Artocarpus integrifolia*), widely available in the country, have been tried for the preparation of pectin, using the alcohol precipitation method.

Preparation of pectin from raw papaya by aluminium-chloride precipitation has shown that a concentration of 0·5% aluminium chloride in the cold at a *p*H of 3·8 to 4·0 gives the maximum yield of pectin. Precipitation at 70°C. lowers the yield of pectin, though the quality of pectin is not much affected. Jelly grade of pectin prepared from peel of raw papaya (18-20% peel in the fruit) is only slightly lower than that from peeled fruit. Peeling is therefore not considered necessary. The yield of pectin prepared from second and third extracts is at its maximum. Jelly grade of pectin goes on increasing up to three extractions, after which it starts decreasing. Storing extract without added SO_2 for 4 days at 2-5°C. or with SO_2 for 4 days at room temperature (20-25°C.) did not seem to affect the jelly grade of the pectin. Methoxyl content of the pectins prepared from extracts stored up to 15 days with the addition of SO_2 at room temperature or without SO_2 at 2-5°C. seemed to remain unaffected.

Most of the soluble solids of papaya mince were leached out by two cold water extractions of 5 min. each. Loss of pectin in leached water was practically negligible.—B. S. Bhatia, G. V. Kirshnamurtly and Girdari Lal, *Food Technol.*, 1959, **13** (10), 553.

News Digest

College Opening Postponed

While sharing the general rejoicing at the birth of the Royal Prince on February 19, the staff and students of the National College of Food Technology at Weybridge, Surrey, were nevertheless cruelly disappointed that the Duke of Edinburgh was understandably prevented that day from visiting the college and formally opening it. They had made intensive preparations for weeks previously to welcome him and show him every aspect of the college's work; the high quality of the demonstrations and exhibits was ample evidence that much voluntary effort had gone into the work of preparation. All this, inevitably, culminated in anticlimax.

What should have been Opening Day was turned instead into an open day. News of the cancellation of the Duke's visit had been received at 5.30 p.m. the previous day, and telegrams had immediately been sent to all the invited guests. In spite of this, something like a quarter of the guests were determined not to miss the opportunity of seeing for themselves the food industry's own college, and loyally turned up; they were rewarded by a surpassingly excellent series of displays showing the various activities of the laboratories.

The new buildings have been in use since last September. They comprise a science laboratory and a processing laboratory, lecture theatre with experimental kitchen (the automatic controls at the fingertips of the lecturer are an educational marvel), assembly hall, refectory and hostel, all built in contemporary style round Netherfield House, whose use is retained as a library, reading room and additional hostel. Great skill has been used to combine the old style of the House with the modern buildings around it without detracting from the individuality of either. Costs have been met both by the Ministry of Education and by contributions from the food industry. The college is sponsored directly by the Ministry and is controlled by an independent Board of Governors representative of the industry under the chairmanship of Sir Frank Shires.

The college is residential and has accommodation for about 80 students. It offers 3 post-graduate courses, a 4-year Associateship sandwich course and a 2-year full-time Diploma course in food technology. The laboratory equipment is of extremely high quality; the food processing section has pilot-scale plants for all major food processing operations, including a canning retort, climbing film and vacuum evaporators, and a spray dryer.

During the 4 years of the sandwich course, students spend alternate periods of 6 months in college and in industry, attending the college from October to March each year and industry from April to September. A number of food firms have promised to provide suitable training during the students' time in industry, and to organise the training so as to provide as wide an experience as possible of manufacturing and quality control methods.

The college authorities have not given up hope that His Royal Highness will be able to visit the college in the near future and formally open it. Such a happy event would crown the work of Dr. Mounfield and his staff and offset the disappointment they have suffered.

British dried egg

A new product, Lion Brand dried egg, has been introduced by the Egg Marketing Board. Prime quality dried egg has never before been produced in this country for commercial purposes.

All dried egg hitherto used in this country has been imported. The majority is used by the bakery and confectionery trades, with a small amount going to the makers of egg shampoos, salad cream, ice cream and other food products such as cake mixes. There is a constant demand which at present runs to about 1,500 tons a year. About 80,000 eggs go towards producing one ton of dried egg, so the demand for one year would mean, if the Board took over the whole market, 120 million eggs being processed.

A commercial quantity of dried egg has already been processed for the Board, but details of marketing have not yet been worked out.

Lion Brand dried egg will be a fresh product correctly produced under strict control form the Board, properly stored and quickly distributed. Its culinary performance will be high and because it will have a lower moisture content than imported dried egg its performance will be superior.

Frequent tests on the bacteriological, chemical and physical aspects will be carried out on the material before it goes on the market.

Pickled onion and shrimp outworkers

While outworking in the pickled onion industry is expected to cease within two years, that in the shrimp and prawn industry is to continue at present.

These decisions have been reached by the Minister of Health, in conjunction with the Minister of Agriculture, Fisheries and Food, after reviewing the arrangements introduced by the Food Hygiene (Amendment) Regulations, 1957, and considering advice from the Food Hygiene Advisory Council.

The reports indicate that the use of outworkers in the pickled onion industry is very localised. The manufacturers themselves are anxious, on grounds of economy as well as of hygiene, to bring the practice to an end at the earliest opportunity and they expect that peeling machines may be available in two years.

The trade and local authorities concerned consider that it would be impracticable to discontinue outworking in the shrimp and prawn industry at present, a view with which the Food Hygiene Advisory Council concurs. The Ministers have therefore decided that the present arrangements must continue but they urge local authorities concerned to renew their efforts to encourage the provision of group-picking facilities in those districts where these do not already exist.

J. H. Fenner in South Africa

J. H. Fenner and Co., Ltd., announce the formation in Johannesburg of J. H. Fenner and Co., Africa (Pty), Ltd., which plans, in conjunction with Reunert and Lenz, Ltd., the manufacture of a range of mechanical power transmission goods in the Union.

Dollar imports

The last remaining restrictions on the import of fresh, chilled and frozen fish from the dollar area were removed on February 1 by a further amendment to the Open General Licence dated May 25, 1959. The foods still subject to import restrictions from the dollar and relaxation areas are fresh apples and pears, canned apples, whole hams, milk and milk products, main crop potatoes, and sugar. Import restrictions from the dollar area only apply to canned fruit, bananas, fresh grapefruit and orange juices, and pig meat.

These pictures were taken at the inaugural press conference for the 150th anniversary of canned foods at the Charing Cross Hotel, London, on January 14. (*Top, left*): The Minister of Agriculture, Mr. John Hare, addressing the conference. (*Top, right*): From left to right: Mr. W. B. Adam (Director, Fruit and Vegetable Canning and Quick Freezing R.A.), Dr. F. H. Banfield (Director, B.F.M.I.R.A.), Dr. E. S. Hedges (Director, International Tin Council) with the Minister examining a can of meat dating from 1823. (*Bottom, left*): Mr. W. B. Adam and Dr. Denis Dickinson. (*Bottom, right*): Mr. W. V. Smedley. (*FOOD MANUFACTURE pictures.*)

Canning anniversary year opens

British celebrations of International Canned Foods Year were inaugurated by the Minister of Agriculture, Fisheries and Food, the Rt. Hon. John Hare, at a special exhibition and press conference at the Charing Cross Hotel on January 14. On view were historic and modern examples of the art of canning, including the oldest can of food in the world, a tin of meat canned by Donkin and Gamble in 1823. Various pictorial displays showed the stages in the process of can making and the varied uses of canned foods in modern life.

In his speech, the Minister told of the enormous expansion of the canning industry in recent years; as recently as 1927 only 3 or 4 million cans of fruit and vegetables were produced in this country, a figure which rose in 1958 to 15 hundred million. Consumption per head had risen from £42 to £68 in the past five years. He had not the slightest doubt that there was a greatly expanding market in sight for canned goods.

Organisations taking part in the celebrations include the B.F.M.I.R.A., the British Tin Box Manufacturers' Federation, the Food Manufacturers' Federation, the Fruit and Vegetable Canning and Quick Freezing R.A., the Tin Research Institute, the Tinplate Conference (1925) and the Worshipful Company of Tinplate Workers alias Wire Workers.

Exhibitions on the lines of that at the Charing Cross Hotel will be held at various places in the country during the year.

Food at the "Ideal Home" exhibition

Food, plain and fancy, from home and abroad, will again be attracting visitors to the galleries of the National and Empire Halls when the *Daily Mail* "Ideal Home" exhibition opens at Olympia on March 1.

One of the overseas exhibitors will be Canada, whose Food Section display concentrates on a range of high quality foodstuffs such as Sockeye salmon, apples, canned peaches, apricots, tomato juice, cake mixes and confections.

Fruit of all kinds and in many different forms will also be exhibited by the Union of South Africa; among them will be fresh fruits, oranges, lemons, grapefruit, etc.; canned fruit, fruit juices, jams and marmalades.

Freshly packed samples of New Zealand butter and cheddar cheese will be on sale at the New Zealand Dairy Products Marketing Commission's display which is set in a typical "dairying" scene with real grass, running water, animated life-size Jersey cows and model calves.

Belgian chicory will be on sale at the Stand of Office National des Debouches Agricoles et Horticoles. Visitors will be able to taste the chicory and purchase samples together with a free brochure describing 36 different ways of preparing it.

"An Ideal Home for Hens," featuring live hens, will be presented by the British Egg Marketing Board and, another official body, the Potato Marketing Board, will be giving cookery demonstrations of new and interesting ways of preparing potatoes.

Many British and overseas food manufacturers will be displaying their products.

Import Licensing Branch: change of address

The functions of Import Licensing Branch were transferred to the Tariff and Import Policy Division of the Board of Trade and the offices in Marsham Street, London, were closed on January 25. All applications and enquiries relating to import licensing should now be addressed to the Board of Trade, Tariff and Import Policy Division, Horse Guards Avenue, London, S.W.1, (Tel. TRAfalgar 8855).

Unilever's scientists learn about business

Unilever Research Division has just held a course on Business Principles at the Unilever Training Centre, Four Acres, Kingston-Upon-Thames, Surrey. It was residential and this and other courses are intended as part of the training of the scientist recruited into Unilever Research Departments. The aim is to give the Scientist a broad understanding of the principles of a business and to illustrate these principles at a greater depth by talks, all given by senior members of Unilever, on the functions of the various Unilever departments such as Finance, Accounting, Transport, Production and Advertising.

These talks were followed by a case study for the members involving the costing of a particular product. The final sessions were given to explanations on the place of research in the Unilever business.

The candidates attending the Course were members of a Unilever research department who have been in the company between two and three years.

OBITA DICTA

● Pigs cannot be expected to follow the rhythm of the party.—*E. German Communist Party.*

● Dairy farmers have found that soft music in the cowshed has the effect of increasing the milk yield.—*The Strad.*

● A comfortable last ride is said to be assured chickens by a new kind of aluminium chicken crate. —*Aluminium News.*

● Pigman Chizh's pork is produced so cheaply that, as he is paid piece rates, he has three times had to ask the management to reduce his wages. — *Sunday Times.*

● When we call you "Nikitusha" (Nice Little Nikita) or "Nikita Kururzni" (Nikita the Corn-Lover) we don't mean disrespect . . . It is our love which speaks. Believe me, nobody ever called Stalin Joseph. — *Letter to Khrushchev in Izvestia.*

● Because of the suspicion that his ruddy cheeks might have an alcoholic glow, Santa's annual pilgrimage through the snow cannot be used in the U.S.A. to promote a distiller's proposition that a nip in time keeps the frostbit away.—*Tickocraft.*

● One firm, Chock Full O' Nuts, is giving 1,000 employees about five and a half weeks salary, and in a letter to them the President, Mr. William Black, says: "If you want to put everything you've got into the job for the coming year and push the bonus up to 10 or 11 weeks you won't get me mad."—*Daily Telegraph.*

● Seasonal meats as luxury gifts are offered by Chicago's Stock Yard's Packing Co. The series starts with a Christmas chest of aged sirloin steaks, followed by ham and Rock Cornish game hens at Easter. After steak specials for July 4 and Labor Day barbecues, it winds up with a frozen Thanksgiving turkey. Price for the series: $150.00.—*Wall Street Journal.*

● One wonders how long it will be before the accumulators of such data (that a certain type of woman who smokes also has underweight babies) realise that, because among the population of the British Isles there is an association between addiction to haggis and a liking for the music of the bagpipes, indulgence in the former delicacy does not necessarily cause a predilection for cacophony.—*Letter in British Medical Journal.*

A carrying capacity of 210 cu. ft., a choice of petrol or diesel engine, independent front suspension, and the option of hinged or sliding doors—these are some of the highlights of the new "Van-of-all-Trades" announced by Commer Cars, Ltd. In addition, the hinged door version can be supplied with an extra door on the near-side to facilitate loading in busy or narrow streets. All versions are equipped with twin, wide rear doors fitted with metal checks to facilitate loading and unloading. Fitted with an up-to-the-minute, contemporary-styled unitary constructed body in heavy gauge steel sheet, the vehicle has been designed to provide trouble-free, economical transport for all trades. To overcome rust and dust, thus ensuring long life, the body is heavily treated with anti-corrosive compounds. In addition, the underside is sprayed with underseal; this is claimed to be the first time this has ever been applied to a quantity-produced commercial vehicle. The driving compartment is fully equipped to provide the greatest possible comfort for the driver and if required two extra seats can be fitted to provide full three abreast seating. Excellent forward visibility is ensured by the deep, one piece wrap-round screen. The well equipped facia panel is fitted with a full width parcel shelf.

Gas at work

The part the Gas Industry is playing in the development of modern industry will be displayed as one of the features of a "Gas at Work in Industry" exhibition in London this month. Models, pictures of plant, and some equipment for use in industry will form the central feature of the exhibition, which takes place at the Royal Horticultural Hall, London, S.W.1, from March 1 to 12.

The exhibition is being divided to show the following main features: Heating liquids; heat treatment; glass working; automatic glass fabrication; flame heat treatment; high temperature radiant heating and gas burners; metal melting; low temperature radiant and convection heating; baking; ancillary equipment.

Two processes using hot water will demonstrate the cooking of hams, and the preparation for the cleaning and stripping of chickens—an important feature of the new broiler industry. Two furnaces will demonstrate clean heat treatment, one a shaker-hearth furnace for case-hardening or surface carbon correction and the other a rotary retort furnace treating small parts and utilising a simplified version of atmosphere gas producer; a conventional belt conveyor furnace with cooling section for bright annealing and brazing will also be in operation.

A complete bakery plant, which during the course of the exhibition will turn out thousands of items, will be in operation. A bakery has been chosen to demonstrate the important part played by gas in the food industries—it is extensively used for the preparation of bread, breakfast cereals, biscuits, sweets and chocolate, and every type of confectionery.

Forthcoming Meetings

S.C.I. Food Group, 14, Belgrave Square, London, S.W.1,: Wed., March 9, 6.15 p.m., joint meeting with Roy. Soc. of Analysts.

S.C.I. Microbiology Group, University College, Gower St., London, W.C.1: March 31 and April 1, Symposium on Continuous Culture of Micro-organisms.

Royal Society of Health, 90, Buckingham Palace Rd., London, S.W.1: March 16, 2.30 p.m., "New Foods for World Needs" by Dr. N. W. Pirie.

The Nutrition Society, Medical College of St. Bartholomew's Hospital, Charterhouse Square, London, E.C.1: Sat., March 19, 9.45 a.m., Symposium on "Nutrition and the Elderly."

PEOPLE

MR. HARRY MCEVOY, has been elected chairman of Kellogg Co. of Gt. Britain, Ltd., and will hold his former office of Managing Director as well.

The board of Kellogg Co. meeting recently in Battle Creek, Michigan, recommended to the British board that the appointment should be made to honour the completion by Mr. McEvoy of 25 successful years at the head of the British organisation.

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MR. HENRY NEWMAN, F.C.A., has been appointed a director of Procea Products, Ltd.

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MR. F. VERNON WELLER, Works Engineer of Klaxon, Ltd., has been awarded the M.B.E. in the New Year's Honours List, for public and political service in Solihull.

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MR. W. J. RENNIE, F.C.A., Director and Secretary of Allen and Hanburys, Ltd., has retired from the Company. He is succeeded as Secretary by MR. L. M. BENNETT, B.A., LL.B.

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Plenty and Son, Ltd., announce the retirement of MR. W. H. S. APLIN after more than 20 years' service. MR. J. F. HALL-CRAGGS who has been elected to fill the vacancy on the Board is the Director in charge of the Company's Filter and Chemical Plant Division.

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MR. B. C. L. SUMMERS, Managing Director of Quaker Oats, Ltd., England, has been appointed a Vice-President of the Quaker Oats Company, Chicago.

As Vice-President — Europe, Mr. Summers' responsibilities will continue to be the development of Quaker's business in all areas of Europe, Africa, and the Near East, while remaining Managing Director of Quaker Oats, Ltd., a position he has held since 1955.

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MR. HAROLD WOOLLEY, C.B.E., who farms in the Cheshire Plain and is a former Deputy President, was elected President of the National Farmers' Union of England and Wales.

COL. H. J. WILSON, O.B.E., T.D., who farms at Robertsbridge, Sussex, was re-elected Deputy President.

MR. G. T. WILLIAMS, who farms in Shropshire, was elected Vice-President.

Mr. Woolley succeeds Lord Netherthorpe, who has held the office of Presidency for 15 years, and who has not sought re-election.

Mr. G. O'Reilly

Mr. T. J. T.-Chowne

Mr. A. K. Gage

Mr. H. McEvoy

Two new Directors have been elected to the Board of E. T. Sutherland and Son, Ltd. They are MR. J. W. PARKINSON, now Director of Production, and MR. G. W. REYNOLDS who has become Commercial Director as well as Buyer to the Company.

Sutherlands Foods Ltd. has also had its management strengthened as a result of increased activity. MR. E. W. LITTLEWOOD is now Director of Production and MR. G. W. REYNOLDS has become Commercial Director and Buyer.

In addition, MR. G. O'REILLY has been appointed National Sales Promotion Manager and MR. T. J. TILSON-CHOWNE is London Area Manager, based at the London sales office and distribution centre at New Malden.

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DR. F. H. BANFIELD, M.SC., F.R.I.C., F.R.S.H., M.I.BIOL., Director of Research of the B.F.M.I.R.A., has been nominated a member of the reconstituted Management Committee of the Low Temperature Research Station of the University of Cambridge and Agricultural Research Council.

•

DR. D. T. LEWIS, has been appointed Government Chemist. He succeeds MR. E. H. NURSE, C.B.E., who has been acting Government Chemist since the death of Dr. G. M. Bennett, C.B., F.R.S., in 1959, and who retires on March 31. Dr. Lewis will take up his appointment on April 1.

A recent American visitor to this country was MR. ALEX K. GAGE (JR.), of the American Machine and Foundry Co., of New York. Until recently, Mr. Gage was Director of Sales at the company's overseas corporation in Geneva, and this year he will be assuming new responsibilities at the New York headquarters of A.M.F. He came here to visit the Cheadle Heath headquarters of Henry Simon, Ltd., to discuss matters arising from the recent agreement between the two companies. Henry Simon, Ltd., will market the A.M.F. range of bakery equipment in the U.K. and Eire.

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MR. JOHN GILPIN has been appointed a director of Fitch Lovell, Ltd. He has been secretary to the company for twelve years.

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MR. R. E. HUFFAM has been appointed Vice-Chairman of A. Boake, Roberts and Co. (Holding), Ltd., and has also accepted an invitation to join the main subsidiary A. Boake, Roberts and Co., Ltd., as Vice-Chairman.

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MR. G. C. KEMP, formerly editor of the quick-freezing industry's trade paper *Frozen Foods*, has taken up a new appointment as Press Relations Officer with Birds Eye Foods, Ltd., from February 1. Mr. Kemp, who is 31, has been connected with the frozen food industry for the past seven years and is one of the few specialist writers in this field.

Erections and Extensions

Ibbotson (Sunderland), Ltd., are having a bakery built on a site at Nile Street, Sunderland, Co. Durham.

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T. Wall and Sons, Ltd., have placed a building contract for the erection of a 10,000 sq. ft. food storage and distribution depot at Princes Avenue, Chatham, Kent.

Eldorado Ice Cream Co., Ltd., are extending and improving their depot at Oak Grove, Wallsend, Northumberland.

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Schweppes, Ltd., are having a distribution depot built at Scudamore Road, Braunstone Frith, Leicester, at an estimated cost of £24,000.

Processed Cheshire cheese

Kraft Foods have introduced processed Cheshire Cheese slices. This company claims to be the first to have discovered a way of processing Cheshire while retaining its flavour and, to a certain extent, its characteristic texture.

Birds Eye fish agreement

Birds Eye Foods, Ltd., have reached agreement with British trawler owners for the supply, at guaranteed prices, of about ten thousand tons of fish for quick-freezing. The contracts, which will be with owners who have vessels based on the Humber, extend from February to the end of July.

Mac Fisheries market broilers

The branded broiler chickens now being marketed on a large scale with guaranteed high uniform quality in Mac Fisheries' shops are claimed to be the first branded broilers in this country. Known as Mac Chicken these birds are especially reared for Mac Fisheries by selected broiler producers and conform to a very rigid specification.

Significance of the Mac Chicken, it is claimed, is that shoppers will find chickens of identical high quality selling at a uniform price in Mac Fisheries shops all over the U.K. A very wide range of weights is available.

Typical of the strict specifications laid down for these birds are the following:

Broilers must be reared from a selected strain producing plump, well-flavoured birds at 11-13 weeks old. They must be white-fleshed, straight-breasted and completely free from bruises and blemishes.

Strict quality control must be maintained at all stages from hatching of the egg to eventual sale. Every bird will be guaranteed in the peak of condition and of the finest quality when sold. Longest period between delivery into the shops and sale will seldom be more than 24 hours.

All birds are frozen immediately after processing displayed in hygienic polythene packs.

Royal Society of Health congress

This year's Royal Society of Health congress to be held at Torquay from April 25-29 will again include a section devoted to food and nutrition. On Wednesday, April 27, in conjunction with the S.C.I. Food Group, (whose Chairman, Mr. T. McLachlan, will preside), Dr. A. J. Amos will speak on "Bread," Dr. A. McM. Taylor will speak on "Meat," and Mr. A. W. Taylor will speak on "Vegetables." On Friday, April 29, Sir Frank Shires, Chairman of the Board of Governors of the National College of Food Technology, will talk on "Meat factories of the future."

The A.P.V. Co., Ltd., have recently completed for Arthur Guinness, Son and Co., Ltd., Dublin, a stainless steel fermenting tun which is claimed to be by far the largest in the world. It is actually 2½ times as large as the tun completed by A.P.V. at this famous brewery early in 1959 which was then the largest. Its dimensions are 63 ft. long by 28 ft. 9 in. wide by 29 ft. 7½ in. high, and its capacity is 8,016 barrels. It required 3,300 feet of stainless steel welding, all of which was ground and polished.

Food service to industry

George King and Co., Ltd., announce that they now have facilities for tube filling, and would welcome enquiries for pilot and experimental runs. They say they are also fully equipped for all types of heat processing, food manufacture, pre-packing, etc.

Company Profits & Prospects

Fitch Lovell, Ltd.

Fitch Lovell, Ltd., have declared an interim dividend of 7½% plus ½% capital bonus on the ordinary capital as increased, since the last interim dividend, by one for one bonus and two for three rights issue and 1,540,000 "B" ordinary shares issued in exchange for acquisitions.

Beecham Group, Ltd.

The Directors of Beecham Group, Ltd., have declared a second interim dividend of 8%, less tax, on the issued ordinary shares of the company on account of the financial year ending March 31, 1960. This dividend compares with a second interim dividend of 7%, less tax, paid on account of the previous year.

Ross Group, Ltd.

Ross Group announces a second interim dividend of 6% and the directors intend to pay a similar final next May. This will make a total dividend of 18% for the year to September 30, 1959, compared with a total equivalent, after allowing for the 20% scrip issue, of 14% previously. Ross Group has agreed to acquire the Rinovia Steam Fishing Co. and certain of its subsidiaries for £300,000 cash, subject to certain conditions.

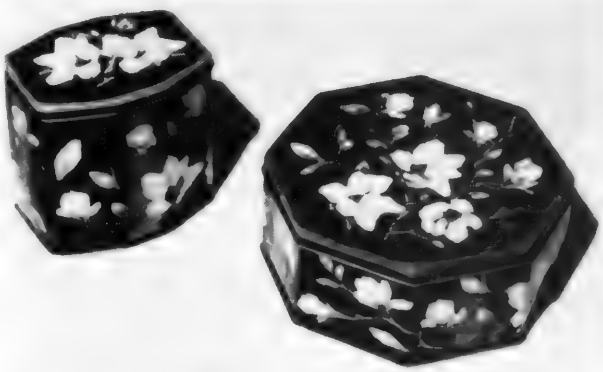
Albright and Wilson—Boake Roberts

The boards of Albright and Wilson, Ltd., and A. Boake, Roberts and Co. (Holding), Ltd., announce that they have reached agreement with a view to the merger of the two businesses. The merger will be effected by an offer of Albright and Wilson shares on the basis of one ordinary stock unit of 5s. of Albright and Wilson plus 2s. in cash for each ordinary 5s. stock unit of Boake, Roberts, and one 5% cumulative preference stock unit of £1 of Albright and Wilson plus 1s. in cash for each 5% cumulative £1 preference share of Boake, Roberts.

Boake, Roberts propose in the event of the merger being carried through, to declare in respect of the year ending March 31, 1960, a second interim dividend of 9½% (less tax) in place of a final dividend. It is intended that this dividend will be paid during April, 1960 to the present shareholders.

Albright and Wilson expect to declare a second interim dividend (to be final) of 13½% (less tax) in respect of the year 1959. Ordinary stockholders of Boake, Roberts will not be entitled to participate in this second interim dividend.

Packaging



All by Metal Box. (*Top, left*)**: The new size of Polypot, no. 36, has been shaped especially for printing and can be printed in the same way as the larger sizes.** (*Top, right*)**: These Chivers 4 lb. packs of frozen peas and petits pois are made from white pigmented Diothene flat tubing with flexographic printing.** (*Bottom, left*)**: These biscuit tins recently won an award at the Packaging Centre.** (*Bottom, right*)**: The Diothene from which these glacier mint packs are made is used unsupported on a fully automatic forming, filling and sealing machine.**

New small pot

The Plastics Group of the Metal Box Co., Ltd., has added a new size to its range of *Polypots*. It is called *Polypot* No. 36 and has a brimful capacity of 3·6 fl. oz. (100 ml.). It is a tub-shaped pot, with a wall thickness of approximately 0·030 in., and is made of high impact polystyrene; it can therefore only be supplied in opaque colours at this stage. It can be printed in up to two colours and varnished. Its shape has been specially designed, so that nearly the whole of its sides can be printed in one or two colours to the same high standards as the other *Polypots* produced by this firm.

The No. 36 *Polypot* can take three different closures; polythene caps, paper caps, and Garda caps.

The many food products for which this container is claimed to be suitable, include cheese, honey, peanut butter, chocolate spread, custard powder, meat extracts, sandwich fillings, malted milk, and cream. Chemical products which can be packed in it include cosmetic creams, ointments, barrier creams, cleaning compounds, cream shampoos, and hair creams.

Unsupported polythene

Fox's Glacier Mints are now being marketed in packs made from 300 gauge *Diothene*, which was adopted because of its sales appeal and the protection it provides. The significance of this particular pack is that unsupported *Diothene* is being used on a fully automatic forming, filling and sealing machine.

It is believed that this Fox's pack is the first example of the automatic packaging operation using unsupported polythene. The appearance of the pack is claimed to be greatly enhanced because it is strong enough to be used without a cardboard backing to preserve its shape.

The machines used for forming and filling the packages are supplied by Bramigk and Co., Ltd.

The *Diothene* is made by the Plastics Group of the Metal Box Co., Ltd. The printing is by the flexographic process.

The colour scheme is red, white and blue, with the pride of place given to a drawing of the Fox polar bear.

Food News Overseas

Decade of whaling in Australia

The Australian whaling industry has proved a valuable asset to the Australian economy in the past 10 years, according to the Minister for Primary Industry, Mr. C. F. Adermann.

Total value of the output of whale oil and by-products of Australian whaling stations over that period has been about £A18 million, of which about £A12,500,000 worth has been exported.

The 1959 season ended with land-based whaling stations on the east coast and Norfolk Island station taking their maximum quota of whales. The west coast catch, however, was below the quota.

Stations at Moreton Bay, Queensland, Byron Bay, New South Wales, and Norfolk Island took their combined quota of 960 humpback whales and obtained high yields of oil, meat and solubles. On the west coast the catch was 731 humpback equivalents —the joint maximum quota fixed being 1,120.

Mr. Adermann said that the decline in the west coast catch might have been related to the high catch of humpback whales taken by the pelagic international whaling fleets in the Antarctic during the first four days of February last. In that period 1,796 humpback whales were taken from the whale stocks that migrate from the Antarctic along the west coast of Australia during the winter.

"This figure represents a tremendous increase, since no humpback whales were taken in this area of the Antarctic in the previous two seasons," Mr. Adermann said.

Stabilising flavour of milk products

A process for stabilising the flavour of milk fat products, especially dried whole milk, has been developed in the U.S.

Although dried skim milk may be stored without refrigeration for long periods without losing its fresh quality, dry whole milk develops storage flavours which make it unacceptable as a substitute for fresh whole milk.

Such objectionable flavours can be prevented, it is claimed, by subjecting separated milk fat to steam action under high vacuum to eliminate the lactones and other objectionable substances.

The method involves flushing steam through milk fat under high vacuum at high temperatures. The fat can then be re-emulsified into skim milk and dried to yield a whole milk with improved flavour quality. This product can be stored under nitrogen to maintain a satisfactory flavour without refrigeration for over six months.

In addition to its use in dry whole milk, the flavour stabilised milk fat can be used in such products as dried ice cream mix and dry cream powders, while the condensed by-products of the steam treatment are said to provide a flavour concentrate of a butter or butterscotch quality which can be used to flavour other foods.

Mr. B. Orchard, manager of the Moa Dairy Co., Taranaki, pictured just before starting up the latest A.P.V. cream treatment unit installation in New Zealand. This is a twin-vessel type L2EH rated at 2,000 g.p.h., and will be used for the pasteurising and deodorising of butter cream. This company installed their first A.P.V. heat exchanger in the mid-1930's; this year they were the first factory to grade 94 points through the New Plymouth port.

Automation in Swedish crispbread factory

The large Swedish manufacturers of crispbread Svenska Knäcke AB are at present test running a new factory at Järna, south of Stockholm, which is claimed to be Europe's most modern in its branch. The factory will, when completed, be nearly 100% automatised. The entire production of 5-6 tons of bread per 24 hr. will be handled by two men per shift from a control room. The factory will be operated continuously in three shifts.

The initial annual capacity will be 1,500 tons of bread, which, however, can easily be trebled through extensions. The first enlargement stage will consist of a silo and a flour mill to enable the company to buy grain direct from the farmers. The factory also included a laboratory.

The "bakery" works in the following way: the rye flour is transported by means of compressed air through tubes up to a giant cistern in a 20 m. high tower. From here the flour is fed down into a machine which automatically mixes the right amount of rye, water and salt every 4 minutes and stirs the ingredients together for the prescribed time. From there the dough passes into a machine which flattens it and forms it into large crispbread squares. While going through the fermentation process the dough moves on a roller band to the electric oven. After baking, the bread is transported on a dryer band to the cutting and packing machines. Along the whole process neither the ingredients nor the ready product are touched by human hand.

Calcutta's adulteration drive

Calcutta's Health Department is carrying out a drive against food adulteration, so we learn from the *Calcutta Municipal Gazette*. With the aid of the police, 875 samples of different kinds of food have recently been collected; these include mustard oil, ghee, butter, wheat, dal, spices, and tea. Of 668 samples analysed so far as the date of the report, 267 were found to be adulterated. 164 cases had been instituted, the rest were awaiting prosecution. Six cases had so far resulted in conviction and the foods had been denatured so as not to be used for human consumption.

Kenya beef is cheapest, but producers worried

A note from Kenya states that beef there is cheaper than anywhere else in Africa or Europe, yet producers' profits are so low, only 6% a year on capital invested, that cases of hardship may arise this year. The Kenya National Farmers' Union's proposals for new prices which would give a return of 12% have been rejected by the Minister for Agriculture. The added prices would have been passed on to the consumer.

F.A.O. appoint fisheries officer for Africa

Dr. A. W. Meschkat, of Hamburg, has been appointed F.A.O. regional fisheries officer for Africa, with headquarters at Accra, Ghana. Dr. Meschkat's task will be to assist governments to develop fish production of the seas off East and West Africa and of the lakes and rivers of Central Africa. He will travel extensively in Central and Western Africa to assess the inland and marine fishery resources and to assist and advise governments in increasing production.

A graduate of Hamburg University, Dr. Meschkat has held F.A.O. fishery assignments in Yugoslavia in 1955, in Brazil from 1956-58, and in Latin America in 1959.

Increase in world fish catch

The world total commercial fish catch in 1958 was 3 million tons more than that of 1957, according to the *Yearbook of Fishery Statistics* recently published by the F.A.O. Japan, with a catch of 5·5 million tons, continued to be the largest producer of sea fish.

The Yearbook, published jointly with a yearbook on statistics on international trade in fish, covers the catch of fish from 1953 to 1958. The total 1958 catch was 33·7 million tons live weight, almost 13 million tons above the single years of 1938 and 1948, just before and after the second world war. Russia reported the highest catch in her history, at 2·6 million tons.

The 1958 total includes a rough estimate of six million tons for production of sea and fresh water fish by mainland China. This figure has been released by the government of that country and represents a 100% increase over its reported catch in 1957.

Danish food fair

The Danish Food Fair will take place in Aalborg between June 3 and 12. The Fair will be opened by and is under the patronage of H.R.H. Princess Margrethe, heir-apparent to the Danish Throne. More than 13,000 square yards of space have been reserved by exhibitors. Every type of Danish food will be on display, as well as packaging machinery and transport facilities.

This is the first time that the whole range of Danish food products have ever been exhibited under one roof in Denmark. The fair will be an annual event.

Rising Indian biscuit and confectionery production

Production of biscuits in India increased from 12,500 tons in 1956 to 17,702 tons in 1958. Output of sugar confectionery improved during the same period from 8,200 tons to 10,212 tons.

The trend of biscuit and confectionery exports is rising. They went up from 2,000 cwt. in 1957 to 3,000 cwt. in 1958. During the first nine months of 1959 they were 2,000 cwt. as compared to 1,500 cwt. during the corresponding period of 1958.

The main customers for confectionery and biscuits were Singapore, Hong Kong, Bahrein Islands, Ceylon, Aden, Kenya, Kuwait and Saudi Arabia.

Notes for Contributors and Authors

The Editor of FOOD MANUFACTURE welcomes articles, news items and other contributions on all aspects of food production.

The purpose of this journal is to exchange information between all those concerned in the food industry. Articles should therefore be written in a readable style, avoiding esoteric terminology and technical jargon, and should contain factual and practical information.

A preliminary synopsis should, preferably, be sent to the Editor, and the contribution itself should be typed in double spacing on one side of the paper only. It should bear the name and address of the author and should be accompanied by photographs suitable for illustrations.

Rebuilt Philippine plant

The Philippine Food Industries, Inc., plant, which was almost completely destroyed by fire last June, has resumed partial operations. As soon as operations allow, the firm will resume producing cocoa butter, cocoa liquor, cocoa cakes and cocoa powder.

New flour mill in Venezuela

The Pillsbury Mills Co., in the U.S.A., was recently reported to have announced plans to build a flour mill in Maracaibo, Venezuela, at a cost of about U.S. $2¼ million, as a joint venture under a partnership agreement with a Venezuelan group.

N. Rhodesia's new sugar refinery

In a message from Lusaka, Northern Rhodesia, Barclays Bank D.C.O. says that the £1¼ million sugar refinery built at Ndola is expected to go into production early this year and it is hoped that full production of 20,000 tons of sugar a year will be achieved by April or May.

Latvians are eating better

Elert Abolins, head of the Latvian Statistical Board, has stated that there is a big improvement in the people's diet. The family of a Latvian worker now consumes on the average only three-quarters of the bread it bought in 1950, and 88% of the potatoes. To make up for this, it consumes 50% more confectionery products, meat, butter, milk, and eggs.

Hungary's production up last year

A report from the Hungarian Central Office of Statistics says that, last year, meat production went up by 13% to 180,000 tons. Output of other foodstuffs also increased, except butter, which fell 2% to 16,500 tons, and sales were stepped up in food stores. Shops sold 10% more meat and meat products, 11% more milk, 25% more butter and 10% more cheese and eggs.

Australian export drive

A drive to expand the Australian home market for canned fruits has been proposed by Minister for Trade, Mr. McEwen, who said that the British consumption figures for canned fruits could be used to encourage local demand. Britons ate about 16 lb. of canned fruits a head each year, 3 lb. more than Australians consumed.

Mr. McEwen, who was opening a new canning plant at Mooroopna, Victoria, stressed the need for an export drive to consolidate Australia's market for canned fruit in Britain and to exploit markets in Canada, Rhodesia, Scandinavia, Hong Kong and Singapore.

New Companies

Ronald Spencer (Feedingstuffs), Ltd. (640678.) To carry on the bus. of brokers and mnfrs. of and dlrs. in feedingstuffs, etc. £500. Subs.: Laurence D. Greaby, 255, Westbourne Avenue West, Hull, Yorks, and B. V. Smart.

D. W. Taylor and Sons (Taymix), Ltd. (641710.) Yarde Farm, Pimperne, Blandford, Dorset. Mnfrs. of animal feedingstuffs, etc. £100. D. W. and Mrs. N. Taylor.

Wigmore's Dairy, Ltd. (639038.) To enter into agreement with F. J. Wigmore and Son, Ltd., and County Dairies, (Oxford), Ltd., etc. £30,000. Subs.: A. R. Maddison, 278, Watford Way, Hendon, N.W.4, and F. B. Mack.

J. Wright (Crowle), Ltd. (641975.) 32, High Street, Crowle, Lincs. Mnfrs. of, importers of and dlrs. in foodstuffs, etc. £2,000. Dirs.: Mrs. Elsie M. Wright, Mrs. Margaret A. Ramsden, T. L. J. Ramsden, and John Holliday.

Bankurel, Ltd. (644631.) 6, Surrey Street, London, W.C.2. To carry on bus. of biscuit mnfrs., bakers, etc. £100. Dirs.: to be appointed by subs., S. H. Lucas and F. A. Dean.

Chocolate-Shake Co., Ltd. (645069.) 12, East Stockwell Street, Colchester. To carry on bus. of mnfrs. of and dlrs. in chocolate drink solutions, etc. £3,000. Dirs.: J. and Mrs. Doris F. Ashley.

City Closures, Ltd. (644469.) 2-3, Warwick Court, Gray's Inn, London, W.C.1. To carry on bus. of mnfrs. of and dlrs. in stoppers and closures for bottles and other containers, etc. £4,000. Dirs.: D. E. Brewster and R. H. Carr.

De Ville and Co., Ltd. (645027.) 11-12, Pall Mall, London, S.W.1. To carry on bus. of distillers, brewers, maltsters, and mnfrs. of and dlrs. in whisky, rum, wine, gin, etc. £40,000 Dirs.: S. R. H. J. H. Del. De Ville and J. W. Warren.

F. J. Dening, Ltd. (644649.) Pavyotts Farm, East Coker, Somerset. To carry on bus. of farmers, growers and mfrs. of and drls. in fruit and vegetables, cereals, etc. £1,000. Dirs.: Fdk. J. and Joan Dening.

Diners, Ltd (644884.) 5, Tilney Street, London, W.1. To design and mnfr. catering equipment, etc. £5,000. Dirs.: to be appointed by subs., R. Torin and R. A. Starnes.

Kelly and Stott, Ltd. (644692.) Elm Street, Manchester, 3. To carry on bus. of importers and buyers and sellers of and dlrs. in meat and poultry, etc. £1,000. Dirs.: J. R. Kelly and R. E. Stott.

Moortown Property, Ltd. (644502.) 24, Market Place, Ringwood, Hants. To carry on bus. of market gardeners, horticulturists, etc. £500. Dirs.: R. P. and Mrs. V. R. L. Letcher.

Mount Everest Foods, Ltd. (644779.) 1, Palatine Road, Southport, Lancs. To carry on bus. of mnfrs. and processors, canners and bottlers of and dlrs. in prepared foodstuffs, etc. £1,000. Dirs.: H. B. Britcliffe and E. Hodgkinson.

Par Pri, Ltd. (644402.) Dynevor Street, Merthyr Tydfil. To carry on bus. of mnfrs. of and dlrs. in mineral and aerated waters, cordials, vinegar, dlrs. in wines and spirits, etc. £10,000. Dirs.: B. Keohane, E. Parry and A. D. Price.

Ratham Mills, Ltd. (644790.) To carry on the bus. of mnfrs. of and dlrs. in foodstuffs, etc. £10,000. Dirs.: J. P. and Mrs. Dorothy R. Heaver.

Serpells (1959), Ltd. (644454.) 26, South Street, Reading. To take over the bus. of mnfr. of biscuits, cakes, buns, pastries, etc. £100. Dirs.: B. S., Wm. T. D., H. A. and B. A. T. Clark.

H. & B. Services (Caterers), Ltd. (645147.) To carry on bus. of ice cream mnfrs. and vendors, caterers, etc. £100. Dirs.: H. E. Hare and Fdk. R. W. Bromley.

Stevens, Fowler and Co., Ltd. (644544.) 10-13, Dominion Street, London, E.C.2. To carry on bus. of importers and exporters of and dlrs. in dried fruits, seeds, animal foods, etc. £20,000. Dirs.: H. C. Russell, H. Stevens, E. F. Fowler and G. R. Epps.

Travel Diners, Ltd. (645010.) 28, Poland Street, London, W.1. To carry on bus. of catering equipment mnfrs., etc. £5,000. Dir.: R. L. Harris.

E. Tulley and Son, Ltd. (644680.) 210, Fore Street, London, N.18. To carry on bus. of nurserymen, market gardeners, etc. £100. Dirs.: A. E. and Kitty Tulley.

Technical Press Review

March

Dairy Engineering. — New Machines for the Continuous Packaging of Cheese; the Waxing of Cheese; the Future of Cheesemaking; Practical Cleaning Routines for the Dairy.

World Crops.—Special Number dealing with Tractors and Tractor Implements; Mechanised Farming in Ceylon; Machinery Syndicates; the Budapest Agricultural Exhibition; Tractors and Agriculture in Italy.

Manufacturing Chemist.—Special Feature; Instruments and Process Control; Instrumentation and Process Control in the Fine Chemical Industries; Continuous Analysis of Process Streams; Worm Infestation; Sulphosuccinates; Progress Reports: Hormones; Detergents; Fertilisers; Therapeutics.

Automation Progress. — Automatic Painting of Transformer Cooling Radiators; Automation on Railways; Logic Systems for Control Systems; Automation in Czechoslovakia.

Petroleum. — Oilfield Development—6; Drilling Fluids, A Current Review; Telecommunications and Ohio Oil Co.; Alaskan Oil Search; Telecommunications in Oil Surveying.

Paint Manufacture. — OCCA Exhibition Preview; Advanced Paint Chemistry—7; Assessment of Paint Durability; Ferranti-Shirley Cone-Plate Viscometer.

For specimen copies write to Leonard Hill House, Eden Street, London, N.W.1.

New Scottish Companies

Macfarlanes Crisps, Ltd. (33503.). 19, Thomas Street, Alexandria, Dumbartonshire. Mnfrs. of and dlrs. in potato crisps, etc. £2,000. Dirs.: G. Macfarlane and Margaret McCreadie.

Menie Fishers, Ltd. (33151.) 1, Walker Place, Aberdeen. Salmon and trout fishers. £5,000. Dirs.: to be appointed.

Scottish Agricultural Aerial Services, Ltd. (33308.) Strathmore Tannery, Coupar Angus, Perthshire. Aerial sprayers of farm lands, pastures, etc. £100. Dirs.: C. J. Campbell, C. L. Chafer, J. V. W. Fleming and A. Pilsworth.

Silver City Trawlers, Ltd. (33408.) Commercial Quay, Aberdeen. Trawl, otter and driftnet fishermen. £6,000. Dirs.: J. M. Robb, A. Robb, L. J. Robertson and J. T. Brown.

Starbank Fishing, Ltd. (33293.) Leith, Edinburgh. Trawl, otter, drift net and line fishermen. £5,000. Dirs.: W. Liston, J. Liston, W. C. Liston and A. McNaughton.

Sturrock and Son (Bakers), Ltd. (33471.) 12, West High Street, Forfar, Angus. Bakers and confectioners. £10,000. Dirs.: W. Sturrock, A. C. Sturrock and Isabella L. Sturrock.

Campbells (Whisky Holdings), Ltd. (33516.) 4, West Regent Street, Glasgow. Bonded store proprietors. £50,000. Dirs.: J. Ross and A. J. Campbell.

Craig-Nicol, Ltd. (33557.) To take over the bus. of Craig-Nicol, refrigerator mnfrs., etc., in Glasgow. £100,000. Dirs.: Andrew Nicol, Wm. Nicol and Ann M. Nicol.

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WALLABY.—788,168. Non-medicated confectionery and sweet biscuits. **Boomerang Confectionery, Ltd.,** Victoria House, London, W.C.1.

BELLE ROSE.—B792,014. Canned meats. **Campbell, Hamilton and Co., Ltd.,** 8, Laurence Pountney Hill, London, E.C.3.

FOX INN.—792,088. Fish preserved in cans and jars. **R. N. Bollans and Co., Ltd.,** Lloyds Bank Buildings, 11-13, Victoria Street, Liverpool, 2.

PRIMULA SLIMBREAD. — 783,331. Crispbread and bread. **O. Kavli A/S,** Damsgardsveien 59, Bergen, Norway.

MISTER SOFTEE.—B786,335. Ice cream, ice cream confections, mixtures for use in making ice cream and water ices. **Mister Softee (United Kingdom), Ltd.,** 32, Shaftesbury Avenue, London, W.1.

STILTS.—786,339. All goods included in Class 30. **British Bakeries, Ltd.,** Millocrat House, Eastcheap, London, E.C.3.

TAST-O-FREEZ.—787,905. All goods included in Class 30 for use in serving with or for making frozen confections or for sale as frozen confections. **Tastee Freez International, Ltd.,** 350, King Street, London, W.6

STARTIME.—791,478. Non-medicated confectionery. **Barker and Dobson, Ltd.,** Whitefield Road, Everton, Liverpool, 6.

PROTOMATE. — 792,544. Condiments. **L. F. Dee (Great Britain), Ltd.,** 5 and 7, Watling Court, Cannon Street, London, E.C.4.

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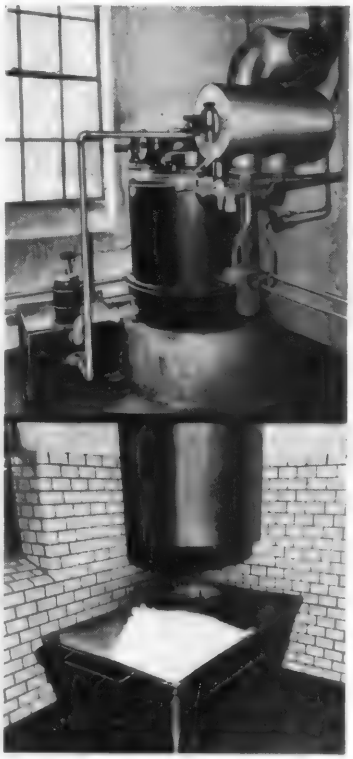

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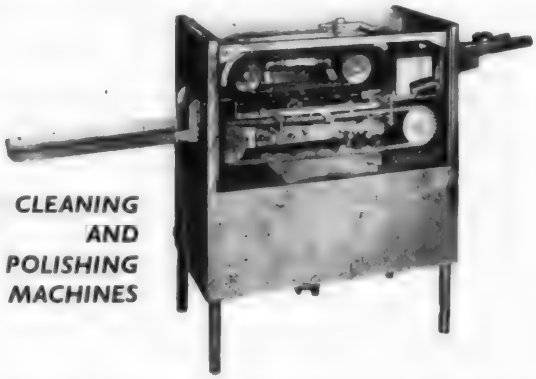

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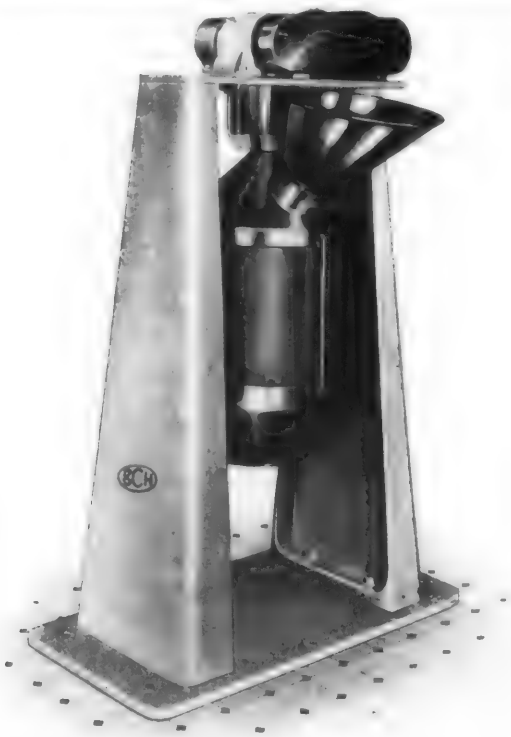

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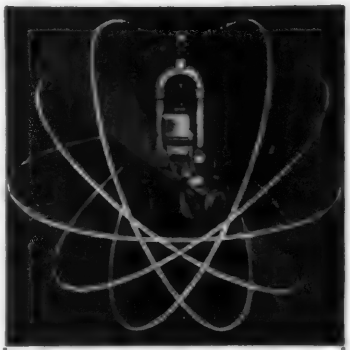

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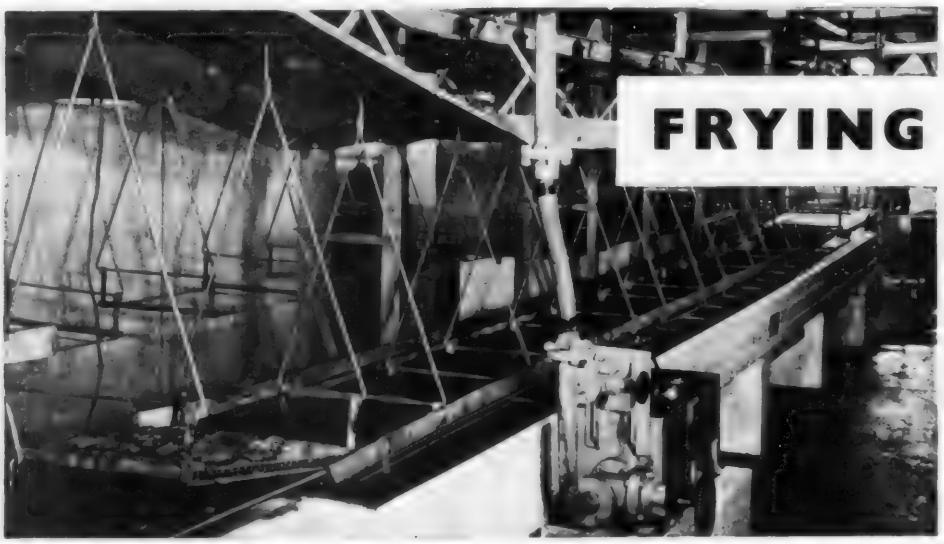

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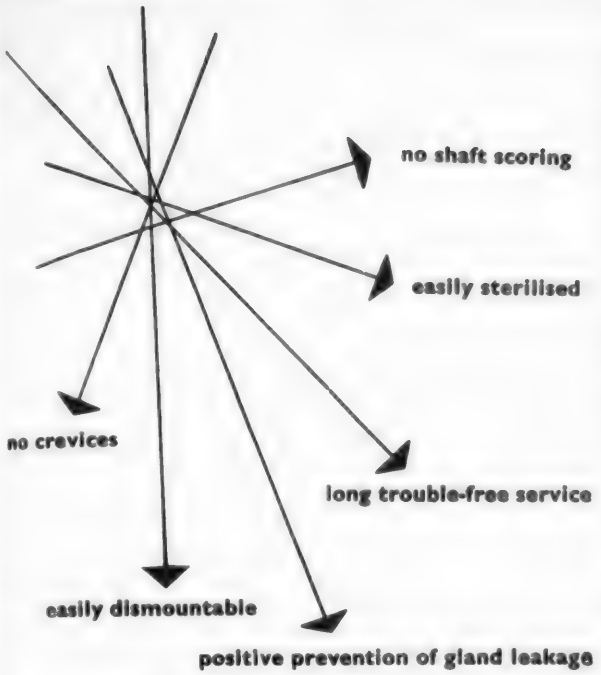

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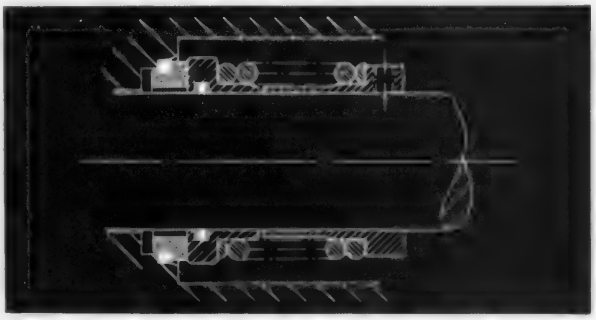

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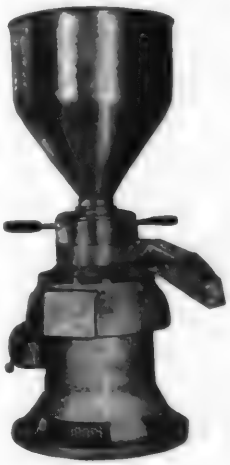

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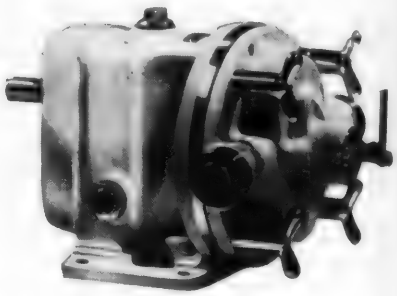

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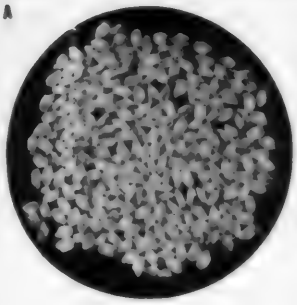

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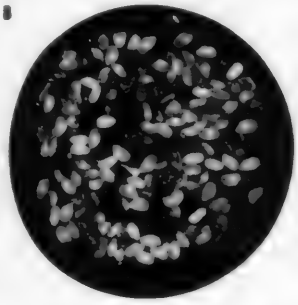

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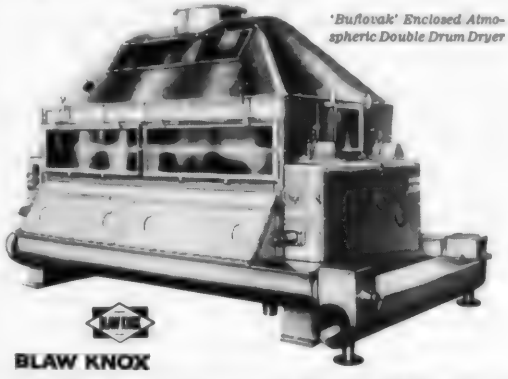

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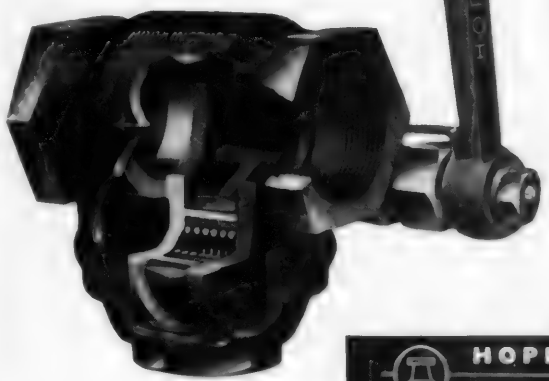

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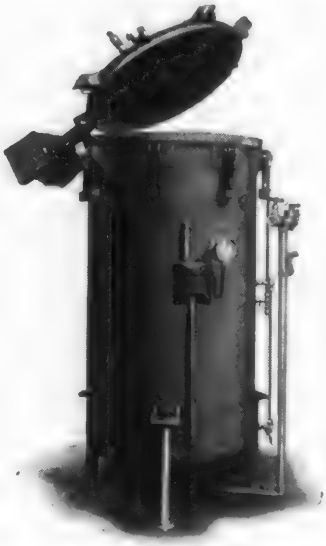

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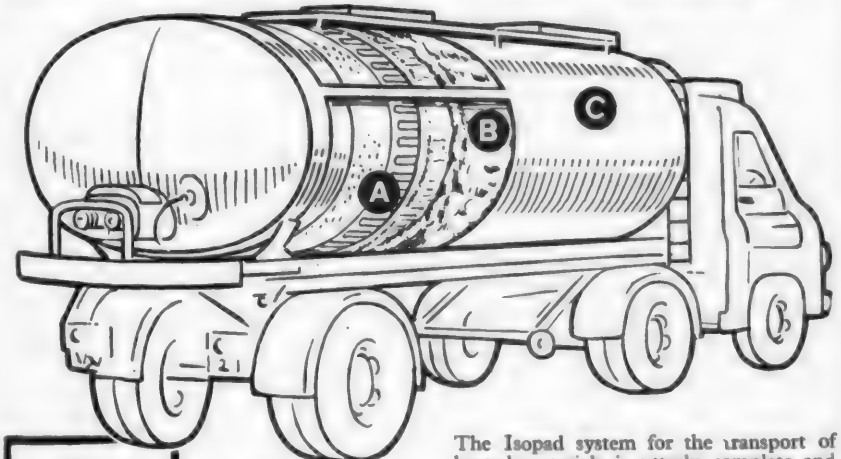

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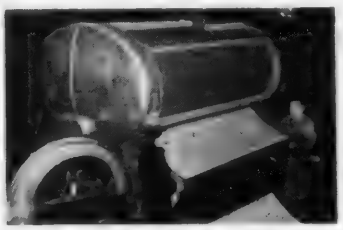

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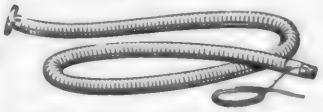

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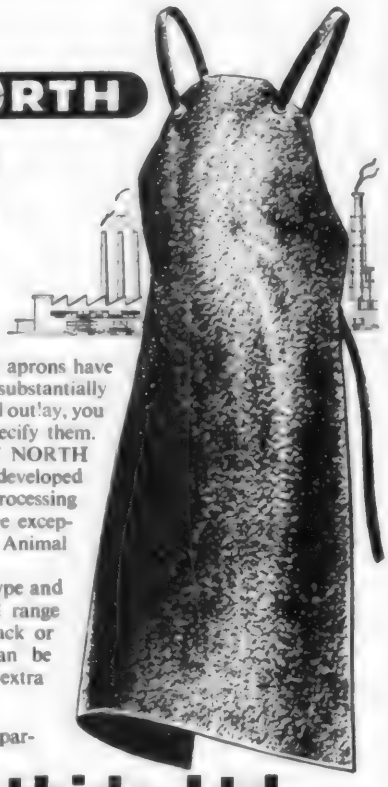

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I.S.I.S. Appointments Register

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I.S.I.S. is an organisation backed by a large industrial group of consultants with contacts in all the industries based on technology. As an addition to their present resources they have established this Appointments Register. Below will be found some of those technologists who are looking for further opportunities. Employers and Personnel Officers are invited to complete the form below, detach and send to the above address. In this particular instance the use of a form, with its attendant simplification of office systems, ensures speedier results for the employer.

Ref. A. 176. British. Male. Age 37. Married. 4 years apprentice, electrical portable tool manufacturers. 6½ years Instrument Maker with meter manufacturers. Seeks post as Scientific Instrument Maker, development work or model, shop only, London, with salary £16 10s. p.w.

Ref. A. 177. British. Male. Age 34. H.N.C. Elec. Engg., Ord. Nat. Dip.Mech.Engg., Grad. I.E.E. 2 years Post-graduate Apprentice. 3½ years Mining (Winder) Engineer. 2 months vacational apprentice, aluminium mill, Switzerland. 2½ years Instrument tester with instrument makers. Seeks post Motor Control Gear Engineer or would consider other posts, Leicester area only. Salary £1,100 p.a.

Ref. A. 178. British. Single. Age 22. Male. H.N.C. Mech. Engg. Craftsman's Cert. for Sheet Metal Work. 5 years apprentice sheet metal worker General Mechanical Engineers. 2½ years draughtsman General Mechanical Engineers. Seeks post preferably Rhodesia, but any country considered, as Draughtsman or Engineer.

Ref. A.179. Irish. Male. Age 31. Single. B.Sc.Chem. Botany. Dip. in Chem. Technology (Engg.). 3 years Chemist with managerial responsibility, Preserves, Canners and Chocolate manufacturers. 4 years Chemist—plant development and instrumentation, whale-oil, meat, extract, frozen meat. At present Science teacher. Seeks post, anywhere considered. Salary £1,000-£1,250.

Ref. A.180. British. Male. Single. Age 36. Grad. I.Mech.E., M.I.Mar.E., O.N.C. (Elec.). 1st class M.O.T. Cert. in Steam and Motor. 11 years Engine Room Artificer (Fitter and Turner) R.N. 2 years Development Engineer Aircraft. 3 years 2nd Engineer Shipowners. 5 months Head Office Surveyor. Seeks post, Bristol area preferred, as Assistant Superintendent Engineer, or will consider any other offers. Salary £20 p.w.

Ref. A.181. British. Male. Age 29. Married. 5 years R.N. Apprenticeship Fitter and Turner. 9 years R.N. Watchkeeping Engineer. Operated and maintained Submarine machinery, including refrigeration and air conditioning plants, small electric and steam evaporator, hydraulic system, diesel generator, optical instruments, steam turbine and boiler plants. Seeks post U.K. or abroad as Maintenance Engineer. Salary £1,200 p.a.

Ref. A.182. British. Male. Age 29. Married. SI and SII Const. Eng., Grad. Inst. Engg. Designers. 3 years Draughtsman, blast furnace engineers. 5 years practical experience in all departments Constructional Engineers. At present Draughtsman, alloy section extrusions. Seeks post U.K. as Maintenance Engineer. Salary £1,000 p.a. min.

Ref. A.183. British. Female. Age 16½. At present Student (Upper VIth) taking "A" level G.C.E. Zoology, Botany, Chem., July 1960. Prepared take further studies night school while working. Seeks post in research work, perhaps bacteriology.

Ref. A.185. British. Male. Married. Age 44. City and Guilds Finals (2). Cert. of Inst. of Indust. Admin., Assoc. of Inst. of Printing Management. 5 years apprentice. 12 years Buyer. 2 years Estimator, printers. 2 years Printer. At present Buyer, lithographic and letterpress printers. Seeks post Manager, printing or Print Buyer, U.K. Salary £1,500 p.a.

Ref. A.186. British. Male. Married. Age 41. O.N.C.Mech.Engg. A.M.Inst. of Brit. Foundrymen, A.Mem. Plastics Inst. 3 years Jig and Tool Draughtsman. 1 year Marker Off. 1 year Inspector, light engineering. 1 year Plant Draughtsman. 1 year Plant Engineer. 4 years Pattern Engineer, iron and steel founders. 1 year Senior Design Draughtsman, cable manufacturers. 4 years Chief Draughtsman, light engineering—machining to fine limits. 2½ years Development and Production Engineer switchgear manufacturers. At present Development Engineer (Mech.). Seeks post Development Production Engineer London Surrey. Salary £950 p.a. min.

Ref. A.187. British. Male. Married. Age 45. 6½ years apprentice and Junior Draughtsman, general engineering. 1½ years Draughtsman, automatic mechanisms and general machine design. 2 years Designer Draughtsman, Technical Calculator, gearing of all types. 1½ years Jig and Tool Draughtsman. 1 year leading design Draughtsman, Ministry. 5 years Assistant Chief Engineer, design of gears, gear boxes, rolling mill gears, stressing and calculating. 5 years leading Designer, diesel locomotives. 1½ years Chief Draughtsman, machines for manufacture and processing leather. 3 years Designer, machine tools. 1½ years Technical Assistant to Director. At present Chief Transmission Designer with large company mass producing automotives. Seeks post U.K. (preferably not in London) as Chief Engineer, Chief Draughtsman, Technical Representative, Design Engineer or Senior Designer. Salary £1,700-£1,850 p.a.

Ref. A.190. Indian. Male. Age 23. Single. B.Sc.Engg.(Mech.). 2 months student apprentice, crankshaft manufacturers. 5 months helper for production and calculation charts. 1½ years Draughtsman, shipbuilders. Seeks post as Engineer in engine works. Salary £650 p.a. U.K

Ref. A.191. British. Male. Married. Age 25. 2nd Class Hon. Elec. Engg. Grad.I.E.E. At present Service Engineer main line diesel electric locomotives with manufacturer of electrical equipment. Seeks appointment design or development work, not necessarily on traction equipment. Salary £900-£950. London, Lancs. or Yorks preferred.

Ref. A.192. Polish. Single. A.M.I.Struct.E. 2½ years Design Engineer. 3 years R.C. Designer detailer. Resident London. Would be interested to hear of work in Structural Engineering which could be undertaken at home.

Ref. A.193. British. Male. Age 29. Single. City and Guilds Telecommunications III. 1 year Cost Clerk, distillers. 2 years Cost Clerk, aircraft manufacturers. 4 years Technical Assistant and 1½ years Technical Administrator, electronics components manufacturers. Seeks post as Technical Administrator, electronics, south coast. Salary £700 p.a.

Ref. A.194. British. Married. Age 33. Male. B.Sc.Mech.Engg., A.M.I.Mech.E., A.M.I.Prod.E. 9 months Junior Engineer oil company. 1½ years Assistant to Manager of centrifugal department. 2½ years Trainee Industrial Consultant. At present Chief Production Engineer. Seeks post as P.A. to Managing Director or General Works Manager or Chief Production Engineer, anywhere in U.K. or New Zealand, Australia, Canada, U.S.A., South America. Salary £2,000 p.a. approx.

Ref. A.195. British. Male. Married. Age 24. O.N.C. and H.N.C. (Mech.) 2½ years Junior Draughtsman, battery manufacturers. 1½ years Draughtsman, light electrical and mechanical engineering. 1 year Draughtsman, chemical and petroleum plant consultants. At present Draughtsman heat exchangers, recuperators, air heaters, boiler plant. Seeks post London as Draughtsman or position "Off the board." Salary £850 p.a.

Ref. A.196. British. Male. Married. Age 22. Physics, Inorganic Chem., Botany and Zoology to Univ. Entrance level. Experience: 4 years Dispenser with pharmacists. At present Clerk to Drawing Office, transmission engineers. This post requires collection and presentation of technical information for the use of draughtsmen and includes detail drawing. Studying for the examination of the Institute of Design Engineers. Seeks post London or abroad (South America) as Junior Draughtsman/Drawing Office Clerk. Salary £650 p.a.

Ref. A.197 Greek. Male. Single. Age 25. Graduate Chemical Engineering. Languages: English and Greek. At present Technical Adviser, industrial and technical installations, chemical industries machinery agencies. Seek Chemical Engineering appointment Africa, Middle East or Australia, or U.K. Salary £1,000 p.a.

[Continued overleaf

To: I.S.I.S. Appointments Register, 9, Eden Street, London, N.W.1. Please ask the following applicants to communicate with the undersigned:

Ref.:____	**Ref.:**____	**Ref.:**____	**Ref.:**____
Ref.:____	**Ref.:**____	**Ref.:**____	**Ref.:**____
Ref.:____	**Ref.:**____	**Ref.:**____	**Ref.:**____

Please use Block capitals

Name: _____

Position: _____

Company: _____

Business or Profession: _____

Address: _____

All introductions are made on the understanding that should an engagement result the employer agrees to I.S.I.S. Appointments Register's terms, which are as follows:

For each person engaged the equivalent of one week's salary payable by the employer within fourteen days of the date of engagement.

Signature_____ Date_____

I.S.I.S. APPOINTMENTS REGISTER (Continued from overleaf)

Ref. A.198. British. Male. Age 26. O.N.C.(Mech). M.O.T. 1st Class Motor Cert. A.M.I.Mar.E. 5 years 2nd Engineer Shipowners. 5 years Apprentice Engineer ship builders and engineers. At present Engineering Inspector marine, turbine, electrical and general engineers. Seeks appointment as Plant or Works Engineer, U.K. (S. England preferred). Salary £800 p.a. minimum.

Ref. A.199. British. Male. Married. Age 30. O.N.C. and H.N.C. (Metallurgy). 11 months Draughtsman, electronic controls. 13 years Draughtsman-Designer-Applications Engineer with a department marketing carbon components for chemical engineering and refractories. At present engaged in quality control with same organisation. Seeks post London as Applications Engineer or Sales Engineer (office based). £1,000 p.a. approx.

Ref. A.202. British. Male. Married. Dip.Mech. Engg., Paris. Corporate Member of Inst. of Mech. Engrs. Experience includes crushing, grinding, screening, and pulverising, mechanical and pneumatic handling, dust collecting, proportioning, mixing and processing, drying, sintering, cooling. Has worked 9 years with U.K. concern and 25 years abroad. Fluent German and French. Having now reached pensionable age seeks part-time or occasional employment Project Engineer designing plant and machinery for the chemical and mineral industry.

Ref. A.203. British. Male. Age 43. Married. Inter.B.Sc., F.R.I.C. Experience: 1½ years Laboratory Assistant cereal millers and brewers chemists. 1 year Laboratory Assistant Government chemist. 3 years Senior Assistant cereal millers and brewers chemists. 9½ years Experimental Officer, chief chemical inspector. At present Deputy Chief Analyst, manufacturers of pharmaceuticals, fine, heavy and rubber chemicals, responsible for quality of all raw materials and finished products, and graduate and technical staff in several laboratories. Seeks post Chief Chemist or Chief Analyst, London or Provinces. Salary £2,000 p.a.

Ref. A.204. British. Male. Married. Age 38. O.N.C. and 4th year Mech. Engg. Assoc.M. Inst. of Engg. Designers. 2 years Senior Design Draughtsman. 7 years Section Leader Design Draughtsman and 3 years design checking of production drawings as 2nd i/c Prod. D.O., all with high vacuum engineering concern. At present Manager plastic fabricators. Seeks semi-Executive post on Production side light engineering, London or Provinces (preferably S. England). Salary £1,000 p.a. min.

Ref. A.205. British. Male. Age 27. Married. O.N.C. (Elec.), H.N.C. (Mech.). 1½ years workshop Trainee, jig and tool manufacturers. 1½ years Machine Tool Fitter, woodwork manufacturers. 1½ years Trainee Draughtsman, heating and ventilating engineer. 2 years Design Draughtsman, contract drawing office. 1½ years Technical Assistant, iron and steel research. 1 year Engineer, hydraulic research. At present Consultant Engineer with civil and mech. consultant engineers. Seeks junior Management post in any field of engineering in London or S. England. Salary £1,100-£1,200 p.a.

Ref. A.206. British. Male. Age 34. Married. B.Sc.(Chem.). A.R.I.C. 2 years Development and Research Chemist, paper manufacturers. 8 years Development and Production Chemist with chemical manufacturers. Seeks appointment as Works Chemist or Works Manager, S. England or anywhere abroad—Americas preferred. Salary £1,700 p.a.

Ref. A.207. British. Male. Age 37. Single. H.N.C. Mech. Engg. A.F.R.Ae.S. 5½ years Toolroom Improver, screw manufacturers. 4½ years Technical Assistant, draughtsman, mechanical test, airflow, aero engine manufacturers. 5½ years Wind Tunnel Technician, aircraft manufacturers. At present Advance Project Engineer (Aerodynamicist), aircraft starters, actuators, ram air turbines, air motors. Seeks post London, Development/Project Engineer or Wind Tunnel Technician. Salary £1,100 p.a. min.

Ref. A.208. British. Male. Age 39. Married. O.N.C., City and Guilds. Mem. Inst. Indust. Supervisors. 10 years Tool-maker, lift and escalator manufacturers. 4 years Foreman Tool-maker, electrical and light engineers. 6 months Jig and Tool Designer, automobile engineers. At present Chief Jig and Tool Designer (Senior Executive Staff) for several years with automobile engineers. Seeks post as Production Engineer or Assistant Works Manager N.W. London or West Herts. Salary £1,300-£1,400 p.a.

Ref. A.209. British. Male. Married. Age 38. M.O.T. 1st Class (Steam). O.N.C. (Mech. Heat). Studying for H.N.C., M.I.Mar.E. 2 years Marine Engineer. 1½ years Draughtsman, civil engineering plant manufacturers. 5½ years Engineer in Charge, National Health Service. 2½ years Chief Engineer, Mercantile Marine. At present Draughtsman, concrete and tarmacadam plant, de-watering equipment. Seeks post London area. Willing consider also Central Africa, West Coast, S. America, Far East, as Draughtsman or Mechanical Engineer. Commencing salary £700 p.a.

Ref. A.210. British. Male. Married. Age 46. A.M.I.Mech.E. courses completed in Mechanical Transport and Petroleum Engineering. Experience: Instructor, Staff College, O.C.M.T. companies. Commander Middle East Petroleum Group. Assistant Director of Supplies and Transport (Petroleum) Middle East and War Office. Command in Cyrenaica, including command two bulk oil installations and three mechanical transport companies. At present Army Officer (R.A.S.C.). Seeks appointment Provinces as Training Officer, Technical Writer (has had free-lance experience), Sales Engineer, Technical Liaison Officer, etc. Salary £1,000 p.a.

Ref. A.211. British. Male. Age 37. Married. N.D.D., H.N.C. (Chem.). 4 years Technical Assistant rennet manufacturers and manufacturing chemists. 3 years Analyst-in-Charge, dairyman. 10 years i/c Laboratory, Government department. At present Schoolmaster (Science). Seeks post as Senior, Assisting in Micro-biological or Chem. Lab. U.K. U.K. (N. England preferred). Salary approx. £750 p.a., but depends, pension and permanency.

Ref. A.212. British. Male. Age 28. Married. H.N.C. Studying for Endorsement subjects for Exemption. Section A. and B. of I.P.E., and I.Mech.E. 1½ years Designer Draughtsman, light machine tools. 1½ years Jig and Tool Designer, chucks. 1½ years General Design Draughtsman and Jig and Tool Draughtsman, machine tools and domestic appliances. 5 years (Army) Electrician, control of equipment, Class I. 3 years Draughtsman, machine tools. At present Chief Draughtsman, metallic packings. Seeks post Work Study or Production Engineer, U.K. (Provinces) or New Zealand. Salary £900-£1,000 p.a. approx.

Ref. A.213. British. Male. Age 30. Single. H.N.C. Mech. Engg. Exemption Grad. M.Inst. of Mech. Engrs. 6 years Apprentice Fitter and Turner, shipbuilding. 1 year Development Fitter, oil seal and gear manufacturers. 4½ years Engineering Inspector, Ministry. At present Design Draughtsman in experimental and development department, cold extrusion process. Interest in cold extrusion of steel, especially re gear steels for motor car and aircraft industry, and seeks post as Engineer—Development or Research—U.K. (Provinces). Salary £1,000 p.a.

Ref. A.214. British. Male. Married. Age 39. O.N.C. (Mech. Eng.). 5 years apprentice and 2 years Draughtsman, electric motor manufacturers. 5 years Draughtsman, aircraft components. 4 years Designer Draughtsman, automobile electrical equipment. 3 years Designer Draughtsman—self employed. 3 years Designer/Draughtsman, petrol and diesel engines, automobile manufacturers. Seeks post U.K. (preferably S. England or Wales) as Chief or Assistant Chief Draughtsman, or any suitable executive position in drawing office. Salary £1,200 p.a.

Ref. A.215. British. Male. Married. Age 41. B.Sc. (Calcutta). B.Sc. (London). Experience: 5 years Army. 4 years Clerk, electricity supply. 5 years Sales Manager, cigarette manufacturers. At present Analyst, electricity supply—3 years experience covers inorganic analysis, very varied analysis, both routine and non-routine. At present attending post-graduate courses on corrosion prevention and analytical uses of sequestering agents. Seeks post as Analytical Chemist, London. Salary £900 p.a.

Ref. A.217. British. Male. Age 36. Member Cardiological Technicians Soc. and Inst. Science Tech. 9 years Technician, Physiology, University. 6 years Senior Technician, Cardiology, Hospital. 1½ years Research Technician, Cardiology, Hospital. At present resident Canada where employed last 3 years as Chief Technician, Cardiology-Pulmonary Laboratory, University Hospital. Seeks post as Chief Technician, university, government research or commercial organisation. Knowledge of electronics. London area preferred.

Ref. A.219. British. Male. Age 39. Married. 8 months trainee, instrument maker. 5½ years Instrument Trainee. 6 months Draughtsman, capacitor. 1½ years Draughtsman, fluorescent light manufacturers. 5 years Senior Draughtsman and Section Leader, electronic equipment manufacturers. 3½ years Designer/Draughtsman, radar and associated engineering (electronic). Seeks post London area, off the drawing board, e.g. Progress/Liaison Engineer, or Instructor for Trainee Draughtsman. Salary £1,036 p.a.

Ref. A.220. British. Male. Age 44. Married. Mem. Work Study Soc. 4 years toolroom experience engineering. 4 years Turner. 4 years machine shop Chargehand. 2 years Production Engineer. 2 years Planning Engineer. 10 years Chief Work Study Engineer, engineering. At present Chief Work Study Engineer, building industry. Seeks appointment London or Kent at Managerial level. Salary £1,200 p.a.

Ref. A.221. British. Male. Age 26. Married. B.Sc. Special Chemistry, physics, maths., biology, German. Dip. of Nat. Coll. of Food Technology. Some knowledge Portuguese. 2 years Food Technologist, analysts' laboratory. 6 months Laboratory Assistant, canners and paste manufacturers. 1½ years Buyer and Sales Manager, canned goods importers and distributors. At present Chairman and General Manager, canned goods importers and distributors. Requires post S. England—not central London—as Executive in Food Manufacturing firm, on production side. Personal Assistant to Director, or similar. Salary £850 p.a. upwards.

Ref. A.222. British. Male. Age 27. Married. H.N.C. (Chem.). A.G.C.E. Physics. Fellow of the Chem.Soc., M. of Soc. for Analytical Chemistry. 6 years Laboratory Assistant, pharmaceutical manufacturers. 2½ years Analytical Chemist, cement manufacturers. 2½ years Analytical Chemist, manufacturers of plasticisers and paint driers. Seeks post, preferably S.E. London area, but would consider abroad, as Technical Representative or Personal Assistant to Chemical Manager or Director. Salary £950 p.a.

Ref. A.223. British. Male. Married. Age 35. B.Sc. Pure Maths., Physics, Chem. 2nd Mate Certificate (Foreign Going). 8 years Deck Officer, shipping. 3 years Estate Management Assistant, local government. 5 years Research Engineer. At present Research Engineer, marine refrigeration. Specialised in marine insulation, both academic and practical. Seeks Research and/or Development post in refrigeration, heat flow or anything marine, preferably U.K., S. Midlands, or Europe. £1,300-£1,500 p.a.

Ref. A.224. British. Male. Married. Age 47. B.O.T. Cert. Inst.Mar.Eng. Exemption Inst.Mech. Engrs. 4 years Marine Engineer, shipping. 8 years Executive Technical Officer, armaments, Ministry. 3 years General Manager, general engineering. 2 years Proprietor of own engineering business. 10 years General Manager/Director, machine tool makers. At present General Manager, general engineers, machine tool makers, metal furniture, jigs, tools, fixtures. Seeks management appointment in Greater London. Salary £2,000 p.a. approx.

Ref. A.225. British. Male. Age 42. Married. Group Cert. at M.T.C. 5 years apprenticeship, general engineers, millwrights. 2 years Liaison Engineer, gauges for gun production, fighting vehicles, etc. 3 years Draughtsman and Production Officer, naval equipment. 1 year Senior Draughtsman, aircraft engines. 3 years Draughtsman, mechanical and electrical engineers. 4 years Engineer Draughtsman, naval ordnance instruments. Conducted own small engineers shop for 10 years. Seeks appointment as Works Manager, Chief or Section Leader Draughtsman or Liaison between D.O. and Works. Also interested Technical Sales. Preferably London, but would consider any district U.K. Salary £900 p.a. upwards.

Ref. A.226. British. Male. Age 32. Married. H.N.C. (Chem.). 4 years Laboratory Assistant, manufacturer of animal feeding stuffs. 2 years Senior Laboratory Technician, educational establishment. At present Analytical and Development Chemist with manufacturer of agricultural chemicals. Seeks appointment, London or S. Wales as Technical Representative. Salary £950 p.a.

Ref. A.227. British. Male. Single. Age 29. H.N.C. (Civil Engg.). A.M.I.Struct.E., Grad. I.C.E. Served 5 years apprenticeship with present employers (structural engineering contractors) and has since been engaged in Design and Detail of Industrial Steel Structures of all types and site surveys. Seeks post London as Engineer or Designer. Salary £1,200 p.a.

Ref. A.228. British. Male. Married. Age 48. F.R.I.C., F.R.A.C.I., F.I.W.M., F.A.I.M., F.P.C.A. 7 years Chief Analyst, food industry (England). 3 years Chief Chemist, then Production Manager, food industry (Australia). 12 years successively Chief Chemist, Production Manager, Factory Manager, Branch Manager, General Manager, food industry (Asia). 2 years Sole Representative Asia for European fine chemicals industry. 3 years Sales Manager, fine chemicals industry (Australia). At present Technical Sales Service and Consultation fine chemicals industry (U.K.). Seeks post as General Manager and/or Technical Director, England or Overseas. Salary £3,000 p.a. min.

Ref. A.229. British. Male. Married. Age 29. H.N.C. (Mech.), Grad. I.Mech.E. 3½ years apprentice, tube manufacturers and manipulators. 3½ years Development Engineer. 8 months Design Draughtsman, tank manufacturers. 3½ years Design Engineer, engineering consultants. Seeks post Provinces or Canada or U.S.A. as Design Engineer or Assistant Engineer. Salary U.K. £1,100 p.a.

Ref. A.230. British. Male. Age 51. Course in Electrical Engineering up to 4th year of B.Sc. (Tech.). Assoc. Fellow Inst. of Petroleum. Mem. American Society of Mech. Engrs. 3 years apprentice mechanical engineers. 2 years apprentice electrical engineers. 4 years Production Engineer, electrical plant department. 1 year Deputy Chief Engineer, mining company, maintenance surface and underground mechanical and electrical equipment. 1 year Assistant Chief Mechanical and Electrical Engineer, Africa, goldfields. 3 years Production Engineer, transformer department, U.K. company. 7 years Military Service, including electrical and mechanical Staff Officer to Chief Engineer. 4 years First Assistant Engineer, oil fields. 3 years Chief Engineer, oil fields, directly responsible to management for major installations. Seeks appointment anywhere except S. Africa or Trinidad—tropics preferred—as Chief Engineer or equivalent. Salary £2,000/£3,000.

Ref. A.233. British. Male. Age 33. Married. Univ. Diploma Qualified Textile Engineer. 8 years Mill Manager, worsted/woollen manufacturer. 6 months administration Manager, blanket manufacturers. 6 months Textile Consultant, agents and shippers. 1½ years Weaving Manager, manufacturers. At present Technical/Sales Manager, blanket manufacturing. Experience in Production Control, Chasing, Sales Liaison, Personnel Control. Perfect German. Seeks post as Technical Sales Manager—not necessarily in textiles—U.K. or abroad. Salary £2,000 p.a.

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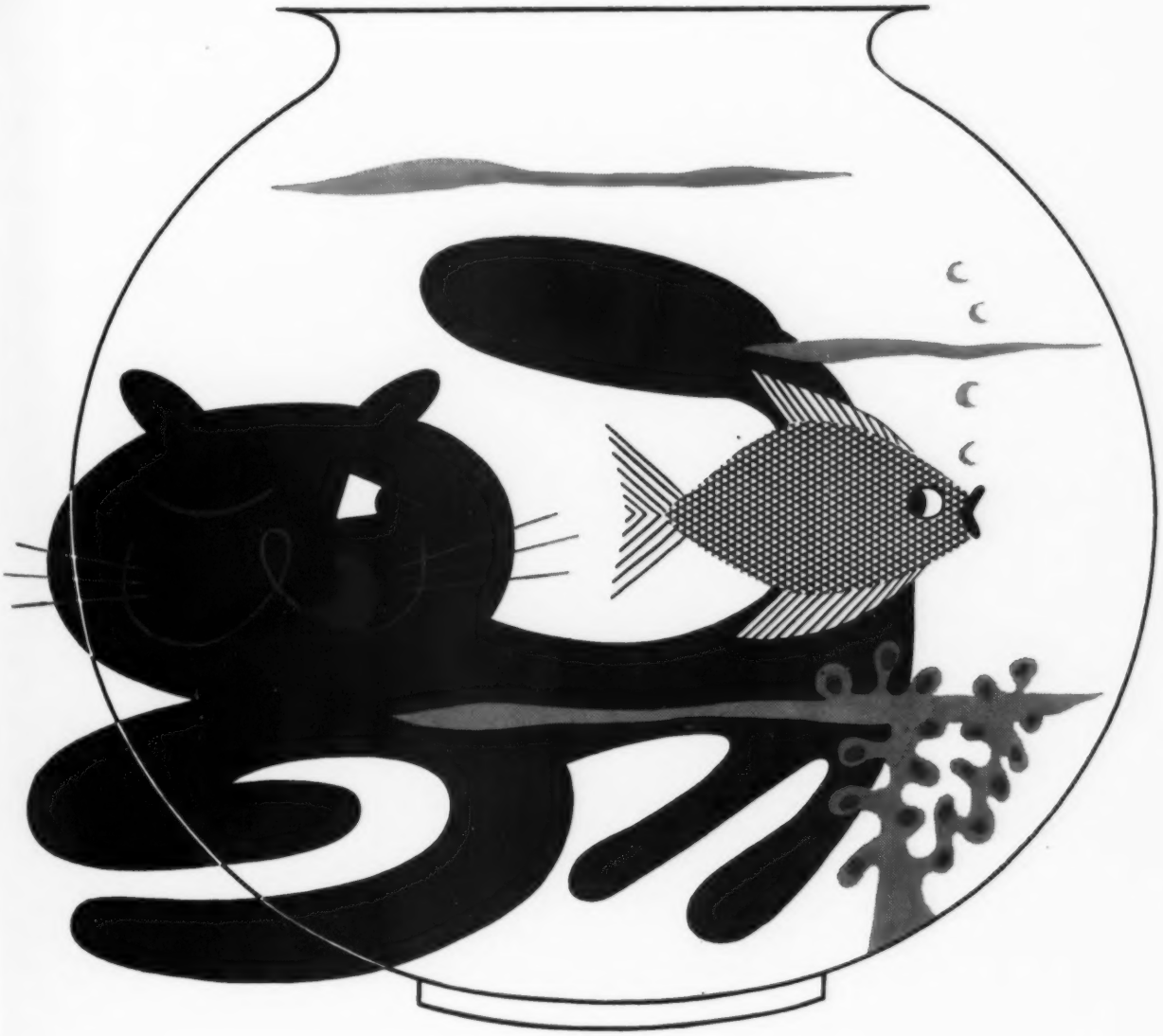

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